COMMUNICATIONS
WORLD
INCORPORATING COMPUTERWORLD ON COMMUNICATIONS
August, 1987
Covering data, voice and image communications
ISSN: 0817-1904

Telecom pours oil on troubled waters

SYDNEY — Telecom, visibly swaying in the winds of change, has made concessions to users on interconnect, pledged to reduce the "arbitrariness" of its decisions and promised some leeway for appeals at a capacity meeting of Atug members here late last month.

But its strategists Jim Holmes and Dennis Hambleton stood their ground on the principles of the interconnect policy and admitted that some ostensibly technical rulings were really intended to reinforce its carrier role during a four-hour "conciliatory confrontation" at OTC House.

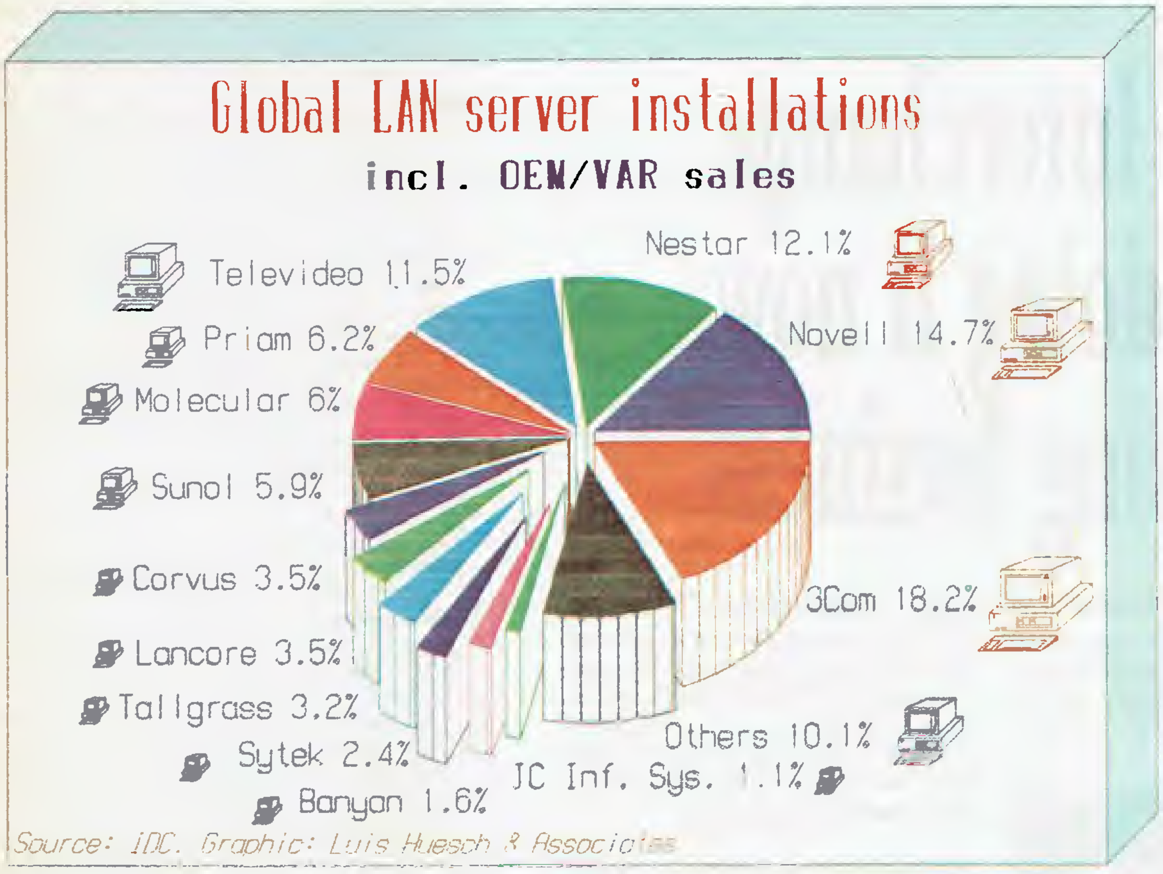
Presenting its revised draft of the new value-added services (Vas) and radio interconnect policies as well as elements of a rewrite of the overall interconnect policy, Telecom announced it would:

- drop all charges on data interconnect
- halve the fee for radio interconnect and
- levy a "commuted charge" of $240 a per connect point
- remove its internal cost advantages in competing with Vas operators and
- look at independent auditing
- negotiate on "cost-recovery charging" with bulletin board operators, and
- move toward timed local calls when it has the technology to police them.

Hambleton, manager of regulatory policy, said Telecom had been "too smart by half" in the area of charging for what it perceived as two main modes of interconnect:

It had found that the bulk of interconnect takes place in the 165-745km charging band, that 90 per cent of all interconnect was for voice, and that most (85 per cent) of the remaining 10 per cent of interconnect was used to access Austpac, databases and other Vas-type facilities.

There were only very few data networks interconnected, said Hambleton, announcing that the commission had therefore decided to drop data interconnect charges altogether. Instead, it would proceed with its plans for Vas charging. Industry observers said Telecom had thus capitulated in the face of clandestine data interconnect by big users, seeing that it could not police the policy.



Source: IDC. Graphic: Luis Huesch & Associates

THE growing use and sophistication of local networks is translating into increased sales of dedicated servers, which experts believe will evolve over the next few years to incorporate functions such as database management and gateways to other environments, even as prices for the products drop.

Until recently, users shied away from dedicated servers, such as those offered by 3Com Corp and Novell, in favour of using IBM Personal Computer ATs or compatibles as servers, server vendors acknowledged.

But that is changing. The market for dedicated servers is heating up, said Doug Gold, a senior research analyst with IDC's Communications Industry Research Group. Gold estimated the server market will grow at a compound annual rate of 41 per cent until 1991, when there will be one server for every two local nets installed.

Most market watchers, including the Seybold Group, see the server market divided into three areas: the lowend IBM Personal Computer AT based server; dedicated servers built on a Motorola

(Continued page 9)

Easements bid follows Vistel coup

MELBOURNE — Telecom is seeking access to railway and utility easements in all States for optical fibre-based communications networks after successfully tying up the VLine routes in a deal with the Victorian government.

Its chief negotiator, Blair Seenaghty, Telecom's manager of fixed network services, was having talks with the Queensland government as *Communications World* went to press.

He declined to give details, but said Telecom was "talking to everybody who has an easement" in Australia. The carrier was seeking to provide all State governments with the best communications capabilities for their needs and was "looking at arranging mutual commitments".

Blair did not disclose the nature of his talks or even his discussion partners, but said Telecom had always been talking to the Queensland government as a good customer, and the "intensity (of these talks) has increased".

Informed sources claimed Telecom had "pulled wool over the State government's eyes" in the joint venture negotiations for the proposed Vistel Victorian telecommunications network.

Telecom had been permitted to lock up — at virtually no cost to the carrier — a strategic part of a national resource and blocked out potential future alternative fibre-optic competitors by securing exclusive access to the VLine easements. The State government, advised by consultants seconded from Telecom, had "given up a public resource for a peppercorn rental", the sources said.

According to these sources, use of the network (*Communications World*, June 87, page 6) is to be split into 10 per cent government use and 90 per cent Telecom use, with Telecom paying a mere three per cent of its revenue from all transmission capacity it puts in which is over and above that contracted by Vistel Ltd. Vistel in turn would receive a 30 per cent discount on the capacity it would obtain for its own use.

(Continued page 8)

The Boston tea-party revisited

MELBOURNE — A big storm is brewing in the industry over an apparently innocent issue: Telecom's insistence on maintaining so-called system-integral handsets. For large users, levies of hundreds of thousands of dollars are involved because of alleged inconsistencies in Telecom's regulatory treatment of telephone handsets.

Faced with massive "maintenance" charges for each of their handsets, users with big corporate voice networks, reinforced with supplier backing through Atug, are about to launch a strong campaign on the issue. This could become the thin edge of the wedge in the overall fight against Telecom's monopoly on PABX maintenance.

System-integral handsets, that is, digital signalling handsets are specifically designed to work with a particular PABX.

In general, such phones provide a greater range of features and facilities through enhanced exchanges with the PABX processor. The signalling involved, though conceptually similar to the ISDN interface, is essentially

(Continued page 5)

INSIDE

Big Blue's new comms barrage
IBM is catching up fast in the connectivity game
— page 3

COMNET '87
Drs Doll and Thurber give some detailed prescriptions
— page 5

NEW: Desktop Communications
The impact graphics have on networks and other PC topics
— starts on page 9

Network Management
A special report on this increasingly important issue begins on
— page 12

Austpac dialup doubles speed

By Luis Huesch

SYDNEY — Telecom has enhanced its Austpac packet switching service with two new facilities, giving international callers telephone line access to the network and offering domestic users 2400 bits/sec asynchronous access.

Introduced without much fanfare recently in response to growing customer demand for dialup entry into Austpac from PCs at the higher speed, V.22 bis access is now possible by dialling the new number 01924 from anywhere in Australia. Procedures are otherwise the same as those for the lower speeds using 01921 (300 bits/sec) and 01922 (1200 bits/sec).

The new data rate makes "bypass" of the Overseas Telecommunications Commission's Midas link particularly attractive, since OTC does not yet offer 2400 bits/sec access. Callers to international databases not only get the speed advantage but also sizable cost savings when they go direct via Austpac. Connect time rates are about half those of OTC.

International access to Austpac from the international telephone network is possible via the following telephone numbers: 61-2-223 3144 (110-300 bit/sec), 61-2-221-3505 (1200 bit/sec) and 61-2-221-3504 (1200/75 bit/sec). The telephone call will be charged in the country of origin. In addition, the Austpac call will be charged in the normal way.

Telecom sees this facility as useful where:

- there is no packet network in the originating country.
- the packet network in the originating country cannot access Australia.
- manufacturers/importers wish to test data terminal equipment for Austpac Pad compatibility or other reasons by "talking" to the equipment from overseas.

The calling modem/s must be compatible with modems used by Telecom Australia.

Meanwhile the Overseas Telecommunications Commission, feeling it was losing touch with Midas, has renamed the packet-switching service OTC Data Access and is offering 9.6K-bits/sec access on X.25 tielines and promising 2400bits/sec asynchronous access "real soon now".

At present, callers using PCs or terminals are limited to 1200 bits/sec. On the other hand, there is no registration fee or fixed charges: the user pays only for connect time and volume of data transmitted.

OTC data products manager Gary Chapple noted that when first introduced, "Midas was essentially a scientific research tool".

Electronic Data Interchange – if you're not doing it now, you could be losing business

Now there's a better way to move data.

The TRACS™ family of batch data communications software products offers a total solution for simple, flexible, reliable data transfer to or from your site.

More companies than ever are conducting business computer-to-computer, using Electronic Data Interchange standards with their trading partners to exchange orders, invoices, inventory data and documents quickly and efficiently. The TRACS family of software products lets you transfer mainframe batch data to and from 90% of the minis, micros and mainframes. This means you can send almost anything to almost anyone without going through JES/Power RJE, writing custom code, or sending hardcopy or magnetic tape. TRACS products support EDI transmission standards for your Electronic Data Interchange network. If you're not using EDI . . . you may be falling behind.

TRACS — TRACS allows host emulation of a 3780/2780 type device with auto dial. Plus, it eliminates RJE record length restrictions. With easy-to-define parameters, TRACS allows data collection and transmission with a wide variety of computers and communications devices. TRACS provides batch 3780/2780 data communications, compatible with all OS or DOS systems. TRACS/SNA supports 3770 RJE communication.

TRACS products support Electronic Data Interchange for fast, simple, flexible batch data communications

SUPERTRACS — With SUPERTRACS, your mainframe can automatically send or receive files at any time of day, without an operator. You specify a list of times and remote sites and SUPERTRACS' Auto Connect facility automatically does the rest. Send or receive multiple files to multiple remotes, simultaneously. Data to be processed is sent directly to SUPERTRACS, bypassing JES, thus assuring security for sensitive data. Then, processed data is transmitted from SUPERTRACS back to the remote sites. This speeds transaction-processing time without increasing overhead. Transmissions can be initiated by either host or remote site.

PC-TRACS — There are two PC-TRACS products which allow the upload/download of files between PCs and mainframes.

PC-TRACS 3780 — provides 3780/2780 emulation, operates in transparency or non-transparency mode, and can transmit files of any size, PC-to-PC or PC-to-mainframe.

PC-TRACS 3770 — provides RJE SNA communications to IBM mainframes. Offers unattended data transfer, host-defined PC file names, hot button toggling between RJE and PC-DOS, plus automatic, on-the-fly format conversion.

The TRACS Family works together or independently
TRACS™ • SUPERTRACS® • PC-TRACS™

For more information call OPTIMUM SOFTWARE on (03) 690 4133

Optimum software
253-255 Coventry St, South Melbourne 3205
Victoria, Australia. Telephone: (03) 690 4133

TRACS family products operate on IBM (or compatible) mainframes or personal computers. TRACS, SUPERTRACS, PC-TRACS are trademarks of Sterling Software.

LOG ON

A SWISS company has taken the idea of credit card billing for communications to its most logical and user-friendly solution: its card stores credit and logon information that automatically takes the user through to his or her desired database.

The Comco-Card system consists of card and a card reader that is placed between the computer or terminal and a modem and is aimed at the mobile executive: it works from anywhere in Australia, North America, Europe or the Far East. Cards are pre-programmed with a certain amount of prepaid transmission time, are valid for a year and can be "refilled". They can also be transferred among users.

Cardholders must have an account with any public packed-switching (PPS) service such as Austpac or Midas, and an account with the host system they intend to call. To call their host, they insert the Comco-Card into the reader, place a call to the PPS access number and press the <Return> key on their laptop or transportable terminal. All other access procedures are then performed automatically, and the carrier's online time is automatically deducted from the card.

The company, now represented in Australia, claims that four minutes of data calls a week will pay for the card and reader combo. There is one drawback: at present the system works at 300 bits/sec only.

THE Overseas Telecommunications Commission (OTC) is launching Australia's first online directory of local and international telex numbers. OTC, which says it has been receiving up to 250,000 telex number inquiries a year, claims that users logging on to the electronic database of 1.6 million telex numbers and some 100,000 fax numbers will usually have to wait less than 30 seconds before the answer appears on their telex machine.

The database also contains a limited number of international teletex "addresses" and can be searched for numbers of companies in a particular business, much like an electronic Yellow Pages. It is accessible initially from telex and computers fitted with a dedicated telex interface as well as to customers of electronic mail services such as Keylink who have a telex number. OTC plans to make the database available to more general electronic access later.

The online directory information, supplied by West German specialists Jaeger & Waldmann, cannot be downloaded to a user system because of locally-written software "locks".

DASNET, a new service that allows exchange of electronic mail between users of many popular electronic mail systems, has been announced by DA Systems of the US.

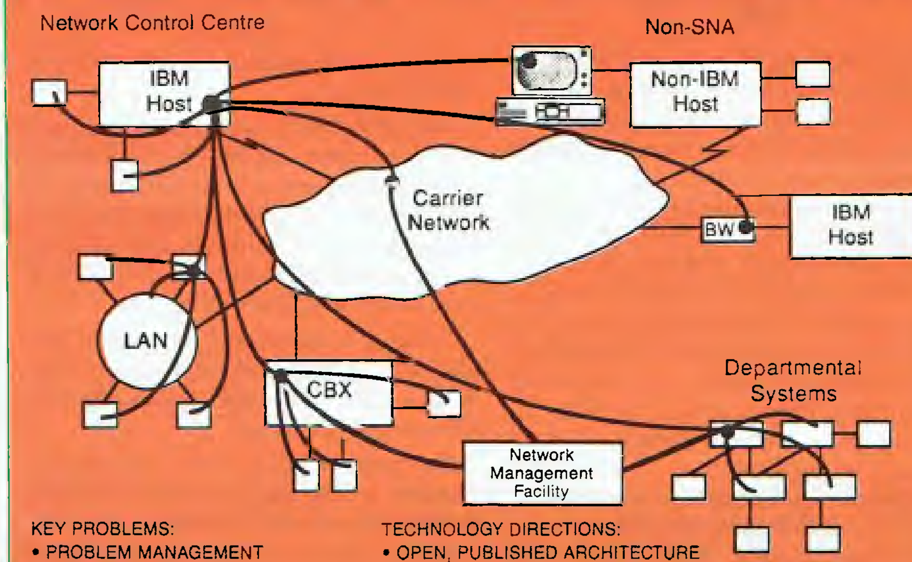
So far Dasnet links Arpanet, AT Mail (certification pending), Bitnet, Dasnet E-mail, DCMetra, Dialcom, Eies, Easylink, MCI Mail, NWI, Peacenet/Econet, Portal Communications, The Source Telex, Twics (Japan), Unison, UUCP and The Well.

In addition Dasnet can link computers running Caucus, Participate, Unix, Vaxmail or Wylbur software for the IBM 308X series mainframes).

The service is offered in three implementations: individual subscription; system subscription (for public or for-fee systems); and site subscription (for companies, organisations, and associations).

Big Blue's new comms barrage

How IBM sees the network world



KEY PROBLEMS:
- PROBLEM MANAGEMENT
- CHANGE MANAGEMENT
- PERFORMANCE/TRAFFIC
- CONFIGURATION MANAGEMENT
- ACCOUNTING
- OPERATIONS

TECHNOLOGY DIRECTIONS:
- OPEN, PUBLISHED ARCHITECTURE FOR MULTIVENDOR ENVIRONMENTS
- STANDARDISED RECORD FORMATS AS PROPOSED BY OSI
- INTEGRATED APPLICATIONS/DATABASE
- CENTRALISED IBM NETVIEW AND DISTRIBUTED CONTROL

SOURCE: DMW

IBM has loosed a barrage of more than 50 communications products that fill key gaps in its line-up and add peer-to-peer networking flexibility to its SNA hierarchial architecture.

The net effect of the recent announcements is that in answer to Digital Equipment Corp's "DEC has it now" slogan it can reply that "IBM has it all" — well, almost.

Among the products were new releases of Vtam, IBM's strategic telecommunications software; enhancements to Netview, the company's host-based integrated network management system; and offerings that add new communications capabilities to the 9370 departmental processor, as expected.

The products, some of which will not be available until well into next year, were seen as an important step in the evolution of SNA from a rigid, host-controlled networking scheme to a blueprint for communications between diverse processors without the need for host intervention.

The announcements transform SNA from a rigid host-based network model to a more flexible model capable of connecting a number of smaller networks, according to Frank Dzubeck, president of Communications Artchitects a US consulting company. The keys to that transformation, he said, are the upgraded versions of Vtam and new capabilities from IBM's Network Control Program (NCP), software that resides in a frontend processor and complements Vtam's networking functions.

The new Version 3, Release 2 of Vtam includes an enhanced Application Program Interface (API) that supports Advanced Program-to-Program Communications between applications using LU 6.2 sessions. LU 6.2 is an IBM protocol that facilitates peer-to-peer communications between applications. Vtam will support communications beween Vtam APPC applications and APPC applications running in other IBM systems, including the IBM System/36, System/38, System/88, Series/1, RT Personal Computer or Personal Computer.

Analysts said the addition of LU 6.2 support to Vtam should help establish LU 6.2 as a de facto standard for transaction processing. Migration to LU 6.2 has been slow because users have had to tailor host software to IBM APIs running on top of mainframe subsystems, such as IBM's CICS. API implementations differed slightly, preventing some LU 6.2 applications on different systems from sharing information.

By placing LU 6.2 in Vtam, IBM established a consistent interface for all host applications and simplified communications among LU 6.2 applications.

However, there are questions about the way Vtam LU 6.2 interface compares to other IBM and non-IBM implementations.

"The Vtam interface specifies only basic LU 6.2 functions, so users have no assurance that host LU 6.2 applications will function with other applications on other systems," said Steven Randesi, chairman of Gen2 Ventures, a Californian consulting company.

To help ensure LU6.2 compatibility, IBM announced a service whereby customers can test LU 6.2 applications for conformance to the APPC architecture before installing them. The service, which will be available in the third quarter, will be provided through the company's Information Network value-added net.

Through NCP, IBM also added PU 2.1 capabilities to its frontend processors, allowing them to establish SNA network sessions without host intervention.

"The addition of PU 2.1 capabilities to NCP will encourage users to link Personal Computers to Personal Computers or Personal Computers to System/36s through their SNA network," said David Passmore, a principal with Network Strategies, a consulting company.

The new release of Vtam also includes a dynamic path feature that makes it easier for network operators to reconfigure networks without interrupting operation. Customers will be able to change, add or delete communications paths without taking the entire network down.

Vtam was also tweaked so customers could more easily maintain communications if a frontend processor failed. A second frontend processor is now able to take over communications responsibilities of the attached devices without losing any sessions. An operator can invoke the backup function over either a leased or switched line.

The 3174 controller is now able to supply single-session terminals such as the IBM 3178, with multiple-session capabilities. A terminal can interact with up to five host sessions, running on a maximum of one IBM and one Ascii host.

A new product, IBM 3737, provides channel-to-channel communications between IBM 370 host systems over a T-1 line.

IBM also added LU 6.2 and PU 2.1 to systems Application Architecture, which enables software vendors and users to develop applications that will run on a variety of IBM 370, System/3X and Personal Computer processors.

PCs benefit from wider link share

WHILE most of IBM's recent announcements fell into the 9370 or Netview camp, the company introduced several other new products related to PCs:

■ The Rolmbridge 5250 Personal Computer Communications Feature, announced by IBM subsidiary Rolm, allows PCs and PS/2s to communicate with System/3X minicomputers. The $US225 software works with the Rolmbridge 5250 Link Protocol Converter in a Rolm CBX.

Rolm also announced a free upgrade for the Rolmbridge 5250 LPC that enables PCs to print files on directly attached printers.

■ IBM's 3174 communications controller has been upgraded with Configuration Support A, Release 3 to allow some 3270-type devices to interact with up to five host sessions. The 3174 can now support 180 Systems Network Architecture Logical Units.

■ The 3194 Display Station, with an Ascii attachment, will be able to communicate simultaneously with an IBM host and an asynchronous host, such as an IBM PC.

Local availability of the new products has not been announced yet.

Strategic role of departmental processor 9370 gets big boost

By Paul Korzeniowski

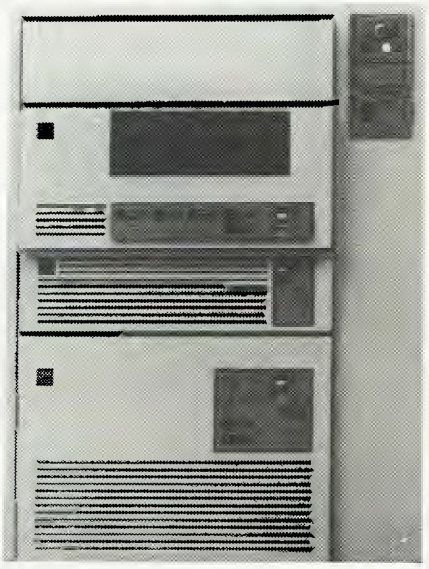
AS expected, IBM has added a lot of meant to the bare bones communications capabilities of its strategic 9370 departmental processor.

Among the offerings unveiled during IBM's mammoth product announcement were a version of Vtam designed specifically for the 9370 and software to attach the processor directly to the IBM Token Ring Network. IBM also enhanced the 9370's LU 6.2 support, brought the processor under the Netview umbrella and introduced software that allows 9370s to communicate over an X.25 net.

Vtam 3.1.2 is designed to provide 9370 processors running IBM's VM or VSE operating systems with communications capabilities equal to processors running the MVS operating system. Previously, VM or VSE versions of Vtam were not as robust as versions running under MVS, industry analysts said.

The new communications software could enable users to cut their costs by eliminating leased lines. Customers will also be able to mix communications from 9370s, IBM 3174 cluster controllers and other devices on a single Network Control Program-controlled multidrop line. Previously, each device required a leased line.

Also, customers can work with switched, rather than leased, lines to connect a remote 9370 to a central host processor. "Customers with batch jobs can transmit information when line costs are cheapest," said David Passmore, principal at Network Strategies, a consulting firm.



Vtam 3.1.2 will be available by the second quarter of next year.

IBM's new Vtam Token Ring Local Area Network Communications Adapter enables a 9370 to connect directly to a Token Ring Network, allowing a 9370 to communicate with another 9370 or with devices on the network.

Vtam maps a local area network station to either a leased Synchronous Data Link Control connection for processor-to-processor communications or to a switched line for a slave-to-master connection. Network alerts can be passed from the Token Ring Subsystem Controller to NetView.

Applications running on a 9370 establish LU 6.2 peer-to-peer connections through IBM's Application Program Interface to Transparent Services Access Facility (Tsaf). The API enables a 9370 to conduct peer-to-peer sessions with devices such as the Personal Computer, System/36 and Series/1. Tsaf has been enhanced to run over an SDLC connection. Previously, the software worked with Ethernet, Token Ring Network and Binary Synchronous Communications connections.

IBM announced two methods of connecting a 9370 to an X.25 network. An X.25 Communications Adapter supports SNA-to-SNA communications over an X.25 network. The 9370 will also be able to support X.25 communications using the Transmission Control Protocol/Internet Protocol. TCP/IP protocols were developed for the Department of Defence, and IBM said it plans to have its TCP/IP implementation certified by the Defence Department. The TCP/IP capabilities will be available in the third quarter of next year.

Netview enhancements enable distributed and departmental 9370s to run unattended, controlled from a central site.

IBM also announced a version of the network management software that runs under the VSE operating system.

Singapore seeks hub status

SINGAPORE has plunged into data services discounting and is boosting its international communications capability as Australia's OTC prepares to snatch the role of regional comms hub.

It has recently commissioned a new satellite earth station to service the Indian Ocean region, with a second antenna planned for late 1988 to cater for the Pacific. Capacity of the new Bukit Timah earth station is laid out for five Intelsat, Inmarsat or Palapa antennas. The new station uses optical fibre for the link to Singapore Telecom's international switching centre, making it one of the first such all-digital setups.

Singapore now boosts five satellite antennas and six cable links for international communications. Before Bukit Timah was commissioned, the Sentosa earth station with its twin antennas facing the Indian and Pacific oceans was Singapore's chief satellite link, complemented by an Inmarsat coastal station.

From this month, wideband digital leased links via Intelsat will be offered, including data circuits ranging from 64K-bits/sec to 8M-bits/sec. The wideband circuits are expected to attract customers with needs for high-quality picture transfers, including circuit design and Cad/Cam.

Charges for existing international 56K-bits/sec leased circuits have been cut from $US10,000 to $US7000, making them the cheapest in the region.

Singapore's Telecom has also slashed charges for its Telepac packet switching service by up to 60 per cent from June.

Dial asynchronous access (300 to 2400bits/sec and telex) is down to $S20/month from $S50/month per network user identity (NUI) and dedicated X.25 access has been halved from the original $S300 to $S600 per port. Volume charges are down to 5c per kilosegment from the original 12c. Usage charges have also been cut, with international calls benefiting most: their cost was halved to 25c/min. Local data calls remain uncharged at 10c for three minutes.

The moves are part of Singapore's strategic information technology plan which also includes Tradenet, an electronic data interchange system initially linking business and government agencies.

Tradenet, now being specified and planned to come online in stages from December next year, will be linked to other EDI systems. The government hopes to entice operators of global network services to set up processing and switching centres in Singapore.

INTRODUCING

9000 SERIES

Matrix Switch*

THE LEADER OF THE NEXT GENERATION IN NETWORK TECH CONTROL

*Patent pending

FEATURES

- Unlimited data bandwidth — in excess of 50 GHz.
- 4096 NON-BLOCKED line capacity.
- Based on unique VLSI chip design.
- Supports V.24, V.35, X.21, X.22 to 256 Kbps.
- Supports Coax circuits — IBM*3270, Wang & Fujitsu.
- Supports G & T series circuits to 20 Mbps.
- Distributed architecture for interface connections.
- Network Control System allows multiple consoles.
- Management and control of complex network topologies.
- On-line service without interruption to switch operation.

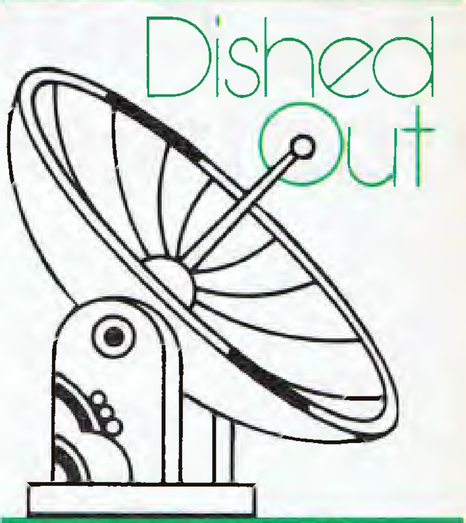
- Small footprint — 1000 x 1000 system requires 5 square metres.

*IBM is the Registered Trademark for International Business Machines.

DATATRAN

Datatran Systems P/L
2-4 Jesmond Road, Croydon, Vic. 3136 Australia.
Telephone: (03) 725 6677. Intl. +61-3-725 6677
Fax: 725 0774. Intl. +61-3-725 0774. Telex: AA151920.
Sydney Office: (02) 957 3035. Distributors: S.A. (08) 46 4062.
W.A. (09) 322 5222. Qld. (07) 352 5788.

PM CW MS



TIDBITS FROM THE SATELLITE SCENE

REUTERS news agency has become the first commercial user of Intelsat's new Intelnet international Vsat service, and will offer business news to clients in Latin America from September.

The spread-spectrum type service used to bypass Latin America's lousy public comms networks is now beaming news and pictures to 1.4m receive-only dishes from the east coast of Mexico to the southern tip of the continent.

HARRIS Corp is to set up a nationwide satellite communications network in Mexico for Operadora de Bolsa, a large stock broking and financial services company.

Operadora, with headquarters in Mexico City, has 25 branches and plans to expand to 50 by next year and to 100 by 1990. Under the $US4 million contract Harris RF Systems Division will instal a complete turnkey system of Harris Pactnet Ku-band satellite terminals for realtime, two-way data transmission between the company's offices. The system is expected to be running by the middle of next year.

TELECOM's Iterra satellite network service has begun production of customer earth stations that can be towed by fourwheel-drive vehicles and says demand for the new units is booming.

The 1700kg unit with a 3m antenna and a special detachable feed can be run off mains or generator supplies and has standby battery power for up to 10 hours.

Circuit capacity is 1-6 channels and HPC is either 1.5W or 3W. When erected in the field the mobile dish can withstand winds of up to 45m/s and will remain functional in winds of up to 20m/s. Passive cooling of the electronics module permits operation of the unit anywhere in Australia without the need for power-hungry air-conditioners.

THE Overseas Telecommunications Commission (OTC) has opened its direct satellite link to Vietnam and says the voice/data Vista service is only the forerunner of similar commercial ventures planned in the region.

Managing director George Maltby said: "Introduction of the Vietnam-Australia satellite service is one of a number of similar entrepreneurial ventures OTC plans for the future."

The link via Intelsat V (see diagram) provides telephone, telex and data links between the OTC earth station at Ceduna, SA, and Ho Chi Minh City, where OTC technicians have installed a 7.5m Vista dish.

Multivendor network is getting more complicated

By Luis Huesch

SYDNEY — The multi-vendor network is here to stay, and its complexity is "getting worse", according to Dr Dixon Doll, chairman of the US telecommunications management company, DMW Group Inc.

Network implementers must face up to this, and it was their responsibility to hide this complexity from the users, Doll told the Computerworld Comnet 87 networking conference in Sydney recently.

Doll also argued that vendors were opening up their networking standards and letting networkers "put their hooks into these things" so that the capacity of their primary products, the computing engines is "driven way up the power curve".

Apart from their larger responsibilities to the enduser, therefore, network planners also had to get top management support because more resources would be needed.

Doll said today's new complex networking environment called for higher level commitments as network planners would not be able to produce all those benefits quickly. In many cases they would be asking for multi-year project commitments that cut across many budget cycles.

"Right now is the time to put the cards on the table and to tell everybody the way it's going to be, to present the benefits and risks fairly and adequately," Doll told his audience, which included representatives from major users and communication equipment vendors.

He said key planning issues were:

- ■ Who was going to own all the networking and applications resources? ("You cannot just throw data up on a network without having somebody responsible for maintaining it and controlling it!")
- ■ Which end of the network would establish the connection? ("In a true peer-to-peer environment any end is able to establish connection to any other end, (but) a lot of the products that you deal with in the business today have restrictions on which end can initiate the information transfer!")
- ■ What parameters needed to be known about the target host environment?
- ■ How an internal utility provider was going to bill and charge your users for making use of the services in that network environment?
- ■ What were the limitations, if any, on the network size and topologies that a company could support?
- ■ By the time all these OSI protocols and TCP/IP and Netview network management and Netview/PC were put in how many new computer systems were going to be needed?

Doll warned that network complexity carried a number of penalties: it was getting more difficult to measure performance and the new networking environments were having "very substantial, far-reaching implications for the organisation structures".

"If we are not prepared to change our organisation structure we must be prepared to deal with the limitations that are going to result from that," Doll said.

Doll said implementation planning issues included systems integration that presents endusers with a single image network.

"The way to do this is to select technology components and come up with ways to extend or enhance the usefulness of a single-vendor network environment."

Doll highlighted "fundamental critical success factors"; one of the keys to tackling the network complexity problem was for the implementer to find a way of hiding the inter-networking commands.

"You cannot sit down at your PC, log on to a local area network, then log on to the gateway, then log on to the wide area network, log on to the wide area network gateway to the other wide-area network and then log on to the first host CPU and go through on a pass-through and then log on to the next CPU downstream. That's the stuff that we have got to hide under the covers.

"Somewhere, somehow, this multivendor environment needs a level of intelligence that the internetting does take place.

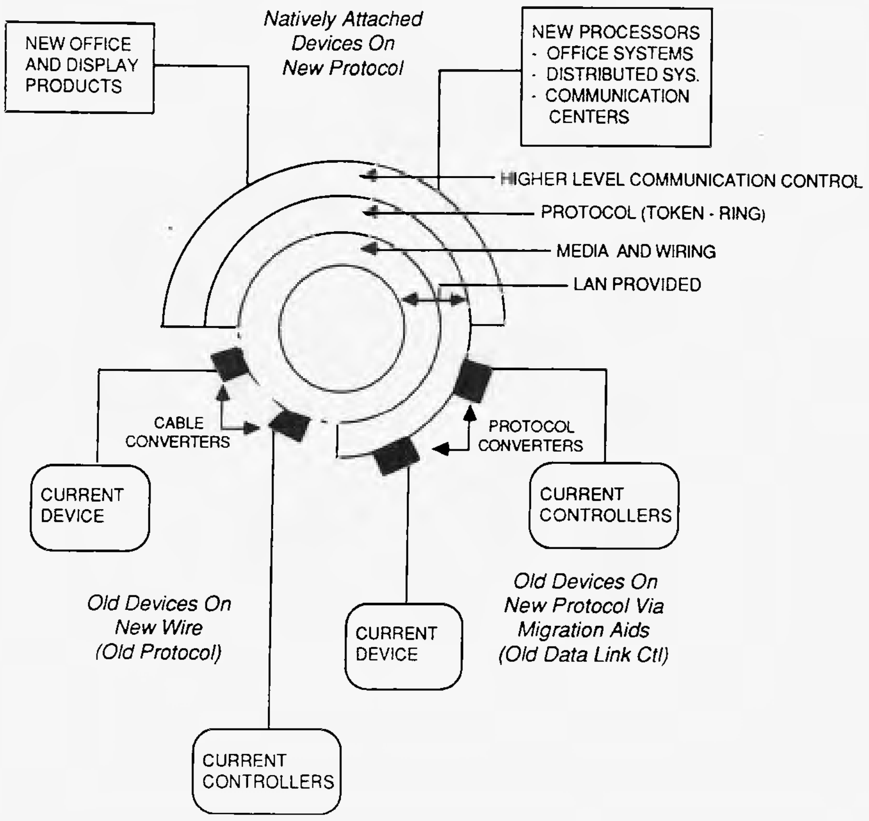
(Continued page 6)

SOME 160 delegates, representing both vendor and user organisations, attended *Computerworld's* Comnet 87 two-day seminar/workshop sessions in Australia and New Zealand last month. Top international networking experts addressed the audience on multivendor network implementation methodologies, Lan options, SNA developments and business and marketing strategies.

The speakers were Dr Dixon Doll, chairman of the US-based DMW Group, a telecommunications consultancy; Dr Kenneth Thurber, president of the Architecture Technology Corp (ACT) of the US, an authority on local area networking, and Paul Wood, the Australian founder and chief executive officer of Systems Technology and its US sister company, Netlink Inc.

The workshops were held by Brian Johnson, senior consultant with Australian company Systems Control. Comnet 87, organised by *Computerworld's* Expo Division, took in Perth, Melbourne and Sydney before concluding with a two-day session in Auckland, New Zealand.

IBM's Lan hardware migration strategy



IBM's overall Lan connectivity strategy is highlighted in this key blueprint for the late 1980s and early 1990s; it consists of three levels, with conversion devices at critical junctions. Source: ACT

Boston tea-party revisited

(Continued from page 1)

proprietary, in contrast to ordinary, universally attachable analogue handsets.

In view of the proprietary, PABX-specific architecture of the digital handsets, Telecom seems to have decided to regard them as part of the PABX itself and thus subject to present PABX maintenance policies.

Unlike third-party telephones bought in as "permitted attachments," and not subject to Telecom maintenance rules, "system integral handsets" must be maintained under a Telecom maintenance contract.

Organisations acquiring system-integral handsets are now faced with "maintenance" bills of $A15 to $A30 per set, depending on the model.

While a case might be argued for mandatory maintenance of system-integral phones because of their alleged "technical complexity" or their method of interworking with the PABX, Telecom policy on the issue is patently inconsistent.

A recent regulatory ruling on one particular handset, classified as system-integral while it is really a basic analogue handset of the kind retailing for around $A100, illustrates this inconsistency.

The manufacturer of the particular phone, a PABX vendor, was unable to gain normal "permitted attachment" status for the device

The vendor, during the past two years, instead obtained "system-integral" status for the set, which not only restricted its attachment to the one particular PABX but also attracted a $A15 maintenance surcharge.

The impact of the surcharge on large organisations is particularly brutal, since many of them have standardised on the handset for their Australia-wide operations. One company which has already bought 5000 of the sets and plans to buy a total of some 20,000 handsets faces mandatory maintenance charges of more than $A375,000 a year.

When you're serious
about your Computer System being productive . . .
When you're serious
about saving money, time and worry . . .
COMMUNICATIONS ■ MAINTENANCE ■ PERIPHERALS
CALL
ADC
APPLIED DATA CONTROL PTY LTD
223-224 Glen Osmond Rd, Fullarton 5063
Tel: (08) 79 9211. Tlx: 89443. Fax: (08) 792 446

Networking teams will circle globe 'like vultures'

TOP class networking teams operating globally will roam the corporate world in the 1990s, looking to shoulder out incompetent inhouse communications departments, according to DMW Group chairman, Dr Dixon Doll.

Doll predicted that if a company did not get its network planning and implementation act together, with project teams growing up and migrating along with projects "owned" by such inhouse teams, then outside specialists such as EDS would attack such companies by "selling their services to the top".

"They are going to be in there pouncing around like vultures, looking for the first signs of any incompetence or lack of excellence inside the internal enduser organisation," he warned industry delegates at Computerworld's Comnet 87 networking seminar in Sydney.

"They are making enormous sums of money from doing this now, and by that time they will be regarding General Motors as a reasonably routine project — even though they do not look upon it that way today — and they will be out looking for fresh meat to devour.

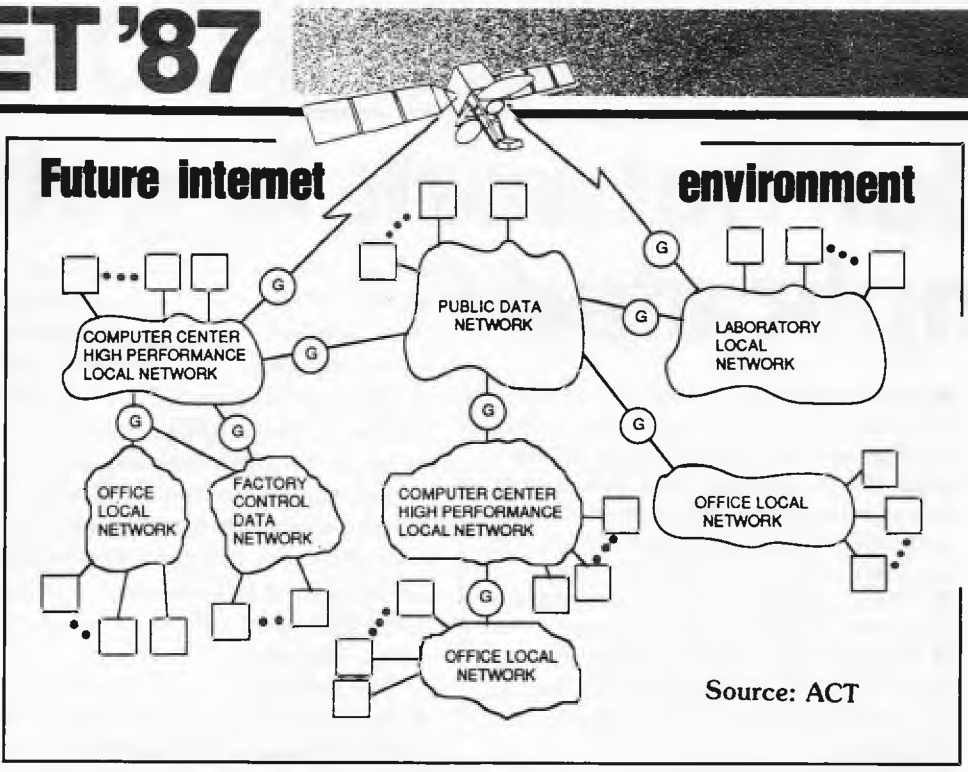
"And I would say that is a good incentive for us to have our own act together," Doll said.

Detailed forecasts

In other forecasts, he predicted that

- "there will be lots of different hosts running OSI — and other protocols — bound to be clearly one of the major industry directions to be in place by the 1990s —
- "there will be comprehensive data stream transformation products, protocol converters, file system manipulation to convert from one text form to another —
- "the screen formats and those kinds of presentation level software, will be very much a commodity item by then —
- "local area networks will be pervasive in the office and in the factories. We are only 10 to 15 per cent of the way there with these networks. That is a tremendous new demand that is going to increase the volume of work on network management and data centre operations and control in the next few years —
- "protocols will be Token Ring, Ethernet, ISN and Starlan, and the other 802. (eight-o-two-dot) families —
- "multivendor network management and control will be defined and partially implemented. There will be dramatic improvements in network management and control functionality, large amounts of artificial intelligence and expert systems embedded in principal vendor offerings to facilitate diagnostic troubleshooting and probable-cause analysis —
- "there will be pervasive linkages between customers in complementary enterprises —
- "there will be new generations of PBXs and T1 engines, T1 speeds of today will migrate to T3 speeds of six and eight megabits/second in the advanced carrier networks of the 1990s —
- "the Bell operating companies in the US deregulated as well as a lot more of the PTTs and the major telecommunications-providing monopolies on a world basis. It is highly likely that Australia's Telecom will be privatised. —
- "ISDN networking solutions with new capabilities like mail, document conversion services and other advanced forms of communication like file transfer will be done on 'features nodes', basically shared application processors that hang off the PTTs' central switches —
- "there will be a steady and continuing progress in the voice/data integration area.

Future internet environment



COMPUTER CENTER HIGH PERFORMANCE LOCAL NETWORK
PUBLIC DATA NETWORK
LABORATORY LOCAL NETWORK
G
OFFICE LOCAL NETWORK
FACTORY CONTROL DATA NETWORK
COMPUTER CENTER HIGH PERFORMANCE LOCAL NETWORK
OFFICE LOCAL NETWORK
OFFICE LOCAL NETWORK

Source: ACT

Make nets prescribes

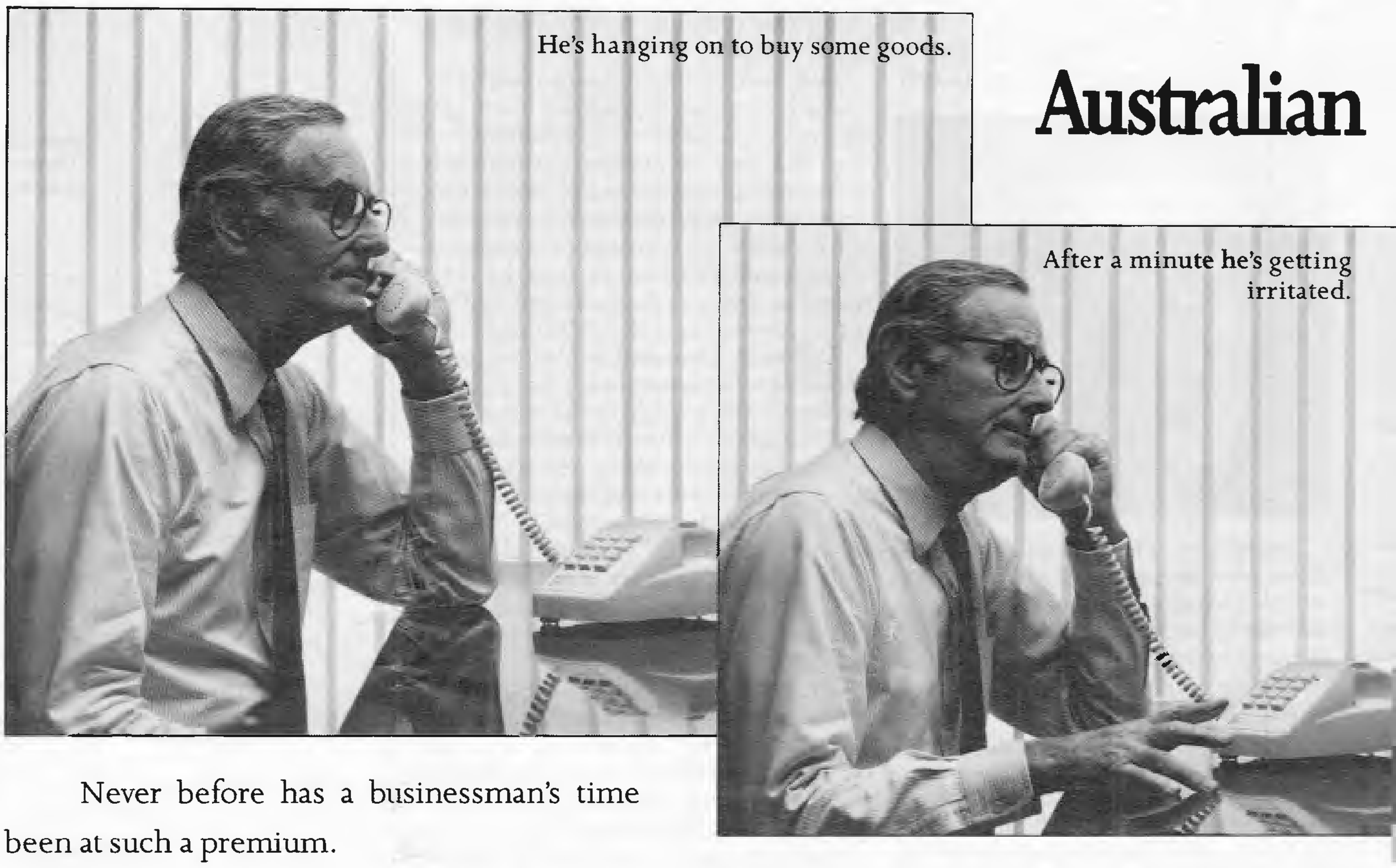
(Continued from page 5)

"But we cannot, if we want this thing to be successful, transfer that burden of knowing all these inter-netting commands to the individuals hooking up to the network environments", he cautioned.

Next the implementer had to select the standards to make sure the network was manageable, reliable and that it was possible to separate the transport from the transport functions."

This was critically important so that when separating local and wide area networks only the transport level is dealt with;

C&C Computers and Communications



He's hanging on to buy some goods.
Australian
After a minute he's getting irritated.

Never before has a businessman's time been at such a premium.

What's more, it's getting more valuable by the day.

To the extent that businessmen worth their salt will no longer waste time with inefficient business practices.

Not in their own company. And certainly not in someone else's.

Yet, if your existing telephone system is straining at the seams, you are forcing both potential and existing customers to hang on.

Inevitably to hang up.

As often as not taking their business with them.

Free with every NEC PABX.
A more efficient business.

Installing an NEC PABX will make a marked difference to your company.

LINTAS NCX 2003

Whether you're a small growing business, a branch office or a multinational headquarters.

Whether you're part of retailing, banking, hospitality service or manufacturing.

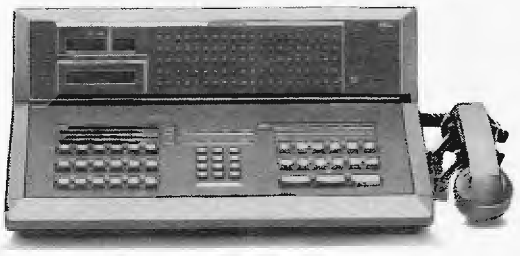
Big or small, it will speed up the flow of information to managers and staff and control communication costs.

In a word it can make your company more efficient.

And as a result more profitable.

Furthermore, because every PABX NEC

Dterm V Phone



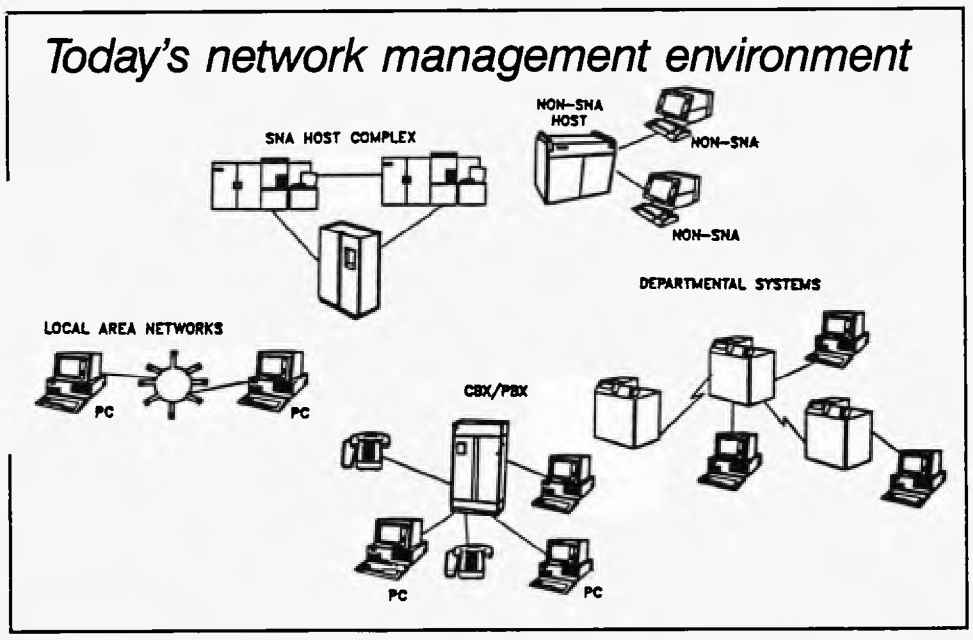
PABX Console

transparent Dr Doll

and higher-level issues of the system interface, the windows, the dialogues, are not impacted."

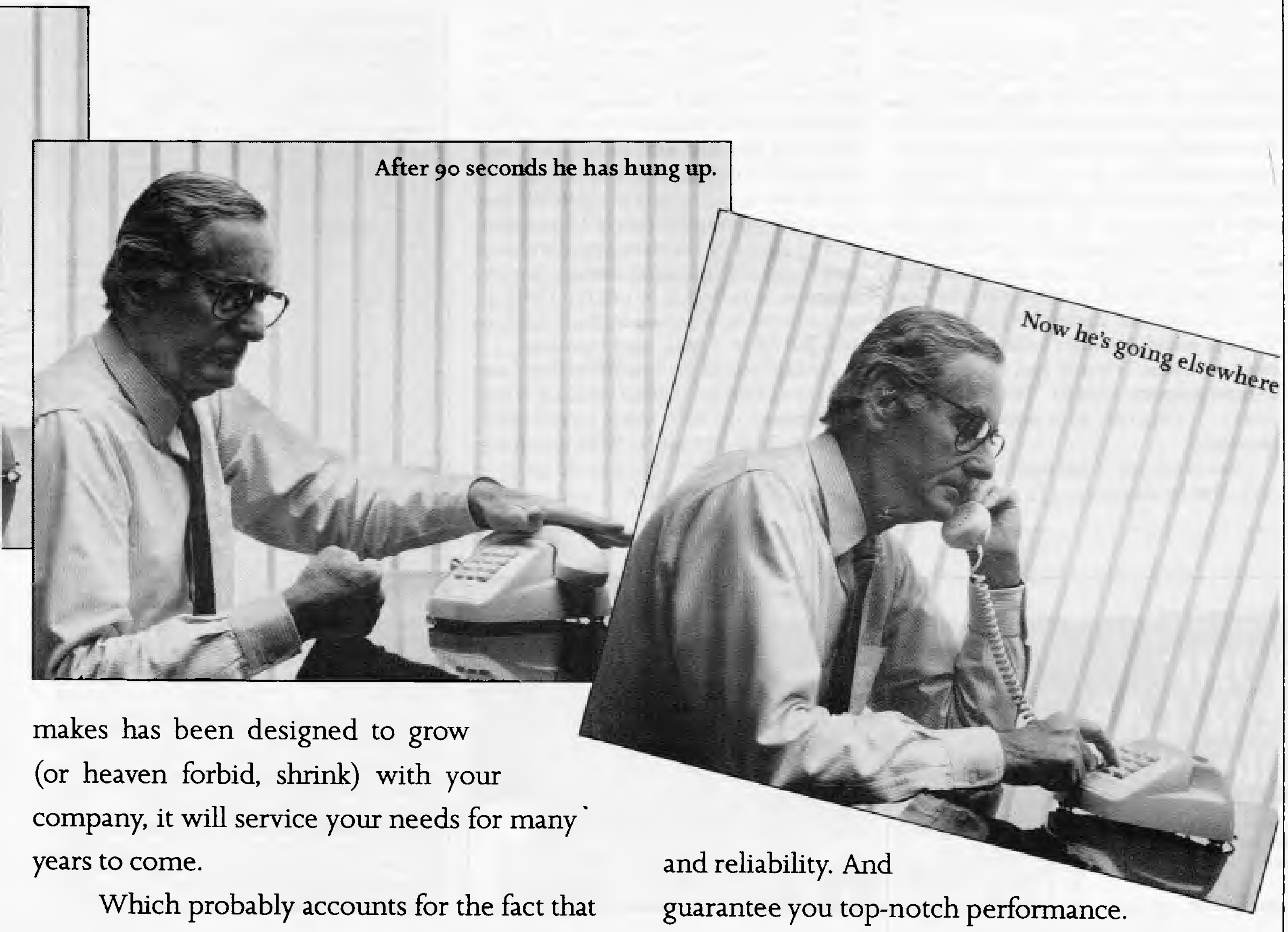
Doll warned against "trying to do too much" and making a network project a grandiose utopia. There were enough practical minefields already including numerous levels of incompatibility, and opportunities for security compromises through different levels of protocol transformation.

"We make one device look like another device look like another device until the end-point application has absolutely no idea of the identity of the originating PC or terminal," he said.



Today's network management environment

business can't afford to hang on any longer.



After 90 seconds he has hung up.
Now he's going elsewhere

makes has been designed to grow (or heaven forbid, shrink) with your company, it will service your needs for many years to come.

Which probably accounts for the fact that 8 of Australia's top 10 companies have already installed one.

One other thing. At NEC we are committed to something that many people don't seem to lay much store by these days.

It's called customer satisfaction. That's why we design, manufacture and support all our own systems.

That way we can guarantee their suitability and reliability. And guarantee you top-notch performance.

The price of a phone call could save you everything.

Find out how an NEC PABX can make your business more efficient.

For more information on NEC PABX call Sydney (02) 436 8111, Melbourne (03) 267 5599, Adelaide (08) 373 2022, Brisbane (07) 52 8800, and Perth (09) 325 2155.

NEC

Promised Lan is out of reach

USERS who expect Lan technology to converge and produce fewer solutions and easier choices have got another thing coming, according to US networking expert Ken Thurber.

"There will be an incredible spread of Lan technology (amid) an incredible movement of computing power to the user," Thurber said in an impromptu interview during Computerworld's recent Comnet seminar in Sydney.

There would be "an explosion of Lan operating systems, all sitting on top of Dos", and 20 to 30 "incompatible approaches" to file servers.

All kinds of Lans would co-exist, lowspeed to highspeed ("all the way up to 30Giga-bits/sec"), which might be used in military applications, he predicted.

"Instead of convergence, there will be an increasing number of solutions and opportunities," said Thurber, president of Architecture Technology, a networks consultancy.

The spectrum of enduser computing options would widen, with a range of workstations (the corporate trend will be to keep control by issuing diskless workstations); a range of file servers; and a range of communications options.

Thurber said Lans must not be regarded as an end in themselves, but users should consider the cost per cycle for applications and workstation connectibility.

He had told seminar attendees that the wait for stability in the Lan market could be a long one.

There were now more than 1200 products ("counting just the basic boxes"), more than 400 different PC Lan applications, and more than 375 companies with an average survival rate in the industry of three years.

Thurber predicted a shift to predominance of the Token Ring away from the Ethernet which he slated for its low load factor. (During the seminar, he obviously enjoyed extracting a repeated public admission of a "12 per cent load optimum" from an unhappy DEC delegate.)

The implementation would be primarily from IBM said Thurber, who forecast a 16M-bit/sec Token Ring data rate in the next six to 12 months. Higher speeds were possible, as Ungermann-Bass had shown with its 50M-bits/sec Lan some time ago, but it had "not been very successful" as people preferred to wait for IBM.

EDITORIAL

The problems are system-integral

AS LONG as Telecom remains the "location of regulatory power", an editorial writer will not run out of issues on which to lock horns in this arena. One could pick any of the Telecom topics in the news pages, from the manner the commission is bulldozing its way into the value-added services field to its inability to get a handle on data interconnect and deciding therefore to push the cost penalties over into the timed call area.

One could raise pretty basic questions about its role in the radio interconnect sphere, indeed about its reported deal with Aussat to run a superset of mobile telephony via the superswitch in the sky.

But let us concentrate on just one very simple and tangible issue raised by a user: what is or is not a "system-integral handset?" And how can mandatory maintenance be levied for instruments that are essentially maintenance-free? To quote the user, "regardless of the wider issue of Telecom's PABX maintenance monopoly the present policy needs clarification of the definition of 'system-integral handsets' as well as of how far Telecom's PABX monopoly does extend down the line.

"Why? For instance," asked the user, "has a basic analogue handset been classified as "system-integral"? And, given that it has, the basis for definition used by Telecom appears unrelated to any technical criteria.

"The classification process has begun to look like a regulatory tool — useful for either restricting the use of certain instruments or to enhance Telecom's position in the maintenance area. Is the 'system-integral handset' merely a figment of the carrier's regulatory imagination?"

Good, useful, down-to-earth questions. And, in answering them, it will not do for Telecom to refer piously to the alleged vendor's maintenance component — after all, this amounts to only perhaps $2 a set.

Since Telecom's policymakers and strategists regularly cite the common weal as the load-bearing basis for their decisions, may we ask the perpetually pertinent question Cui bono? *For whose benefit is the handset maintenance charge levied? For the excess, maintenance cost of an analogue handset on Mornington Island?*

Telecom's coup on easements

(Continued from page 1)

Seenaghty denied this. "This is quite wrong, there is no question of a 3 per cent payment. We are selling transmission capacity to the State government," he said.

He said later it was "really a totally different deal" with Victoria making an undisclosed up-front payment in return for "indefeasible user rights". He parried questions about Telecom's capital cost of providing the Vistel service, the carrier's total investment in the planned network, its total capacity, Vistel's upfront payment or the annual maintenance figure.

Blair described the construct of indefeasible user rights as an international concept developed in connection with rights to submarine cable use. He said in the Vistel case it gave the government "many of the advantages that flow from ownership — of course it would be illegal for them to own it (the network) — while avoiding the hassles" associated with owning and operating such a large network.

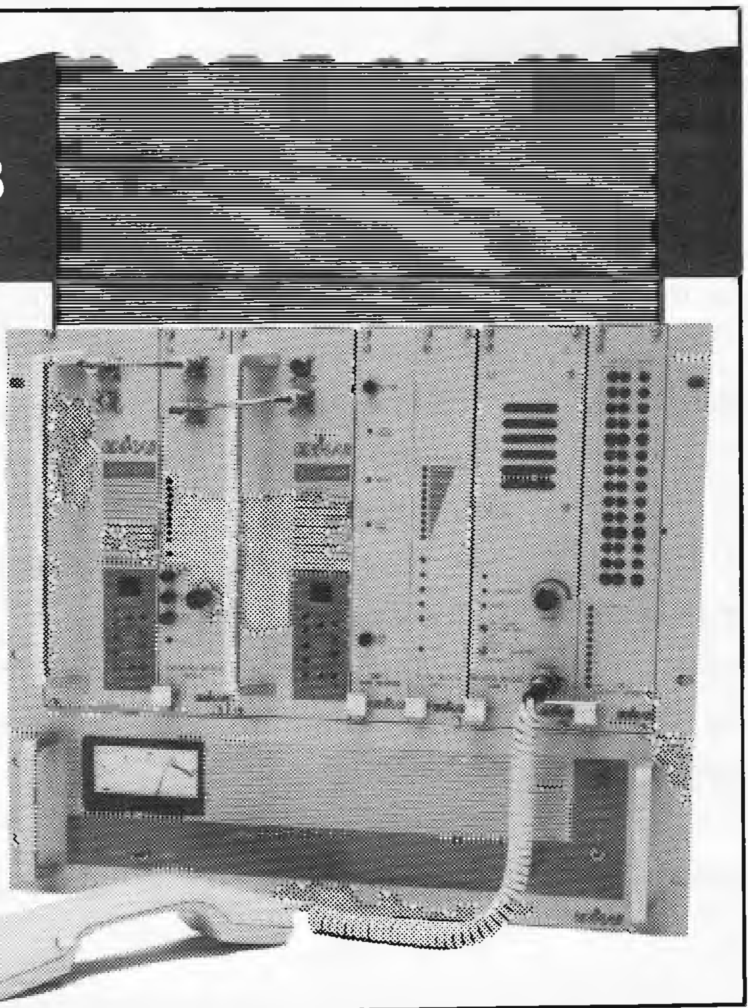
He rejected claims that the legal construct was used to get the State government off the hook, as far as the Telecom Act was concerned, over the resale of communications capacity to individual government instrumentalities. Blair said "stringent restrictions" had been stipulated for Vistel's use of the network. He did not elaborate.

The general manager of Vistel Ltd, Tony Newstead, said there was no question of having surrendered exclusive rights to Telecom. He said that under the Telecom Act, Victoria could not have built such a network, whereas Telecom had access rights to State property anyway. "Telecom has the power — they can do it anywhere," said Newstead.

Newstead said Vistel was "very happy" with what he described as "a memorandum of understanding, an undertaking to cooperate". The solution reached "insulates us from tariff increases," he noted. Presumably, the happy feeling was mutual since, as Newstead put it, "it kept Vistel from doing a Q-net". He hinted, however, that a full-fledged satellite solution would not have been cost-effective, and added that Vistel would levy "realistic long-term charges" on the satellite component of the Vistel scheme now undergoing pilot trials at 10 locations.

The terms of the memorandum were now being cast into legal contract form by Telecom, who hoped to use the Vistel arrangements as a model in their dealings with the other States, said Newstead.

He said one of the benefits to Vistel was that extra capacity could be obtained at very low incremental cost. Vistel was contracting up to 34M-bits/sec by 1990, which was "more than enough", but it could go up to 140M-bits/sec if required.



Modular VHF/UHF Basestation from UNI-LAB ...Basically Brilliant!

The new range of KU Series Modular Basestation and Repeater equipment offers the very best in features and performance.

A unique but simple concept of designing a single plug-in Tx/Rx module has revolutionised the traditional basestation scene.

Two identical modules comprise our basic Talk Through Repeater. You get duplication free!

All modules are D.O.C. approved from 66-88 MHz, 146-174 MHz and 403-520 MHz bands. They offer 64 synthesised channels from an EPROM. Numerous inbuilt features are standard.

Ask to see UNI-LAB's range of options including:—

- Voting • Supervisory • VSWR & Power Monitoring
- Line Interfaces • Automatic Testing & Changeover
- High Power PA Modules • Technician Access.

All models plug into a standard 6RU frame for 19 inch rack mounting.

UNI-LAB
TELECOMMUNICATIONS LTD.
459 Scarborough Beach Road, Osborne Park W.A. 6017
Tel: (09) 444 9855 Telex: 96245 Fax: (09) 444 9663

COMMUNICATIONS WORLD

Editor: Luis Huesch
Contributing Editors: Tom Amos, Noel Bennett
Production Editor: David Blackburn

Communications World is part of the CW Online News Service, which includes sister publications Network World and Le Monde des Telecoms.

ADVERTISING:
National Advertising Manager: Terry Swan
Western Australia: Winkie Corfield (09) 384 5856
Co-ordinator: Judy Lins

CIRCULATION:
Manager: Shirley Ingram
Supervisor: Dorothy Adams

PRODUCTION:
Manager: Max Jaeger

MANAGEMENT:
Publisher: Alan Power

Communications World is published by Computerworld Pty Ltd

Managing Director: Alan Power
Directors: Patrick J McGovern, W Walter Boyd
General Manager Barbara Howell

Computerworld Pty Ltd also publishes: *Computerworld Australia; Australian PC World; Australian Macworld; Greenbook of Software and Related Services.*

Computerworld Expo organises integrated conferences and exhibitions.

SYDNEY HEADQUARTERS:
Computerworld Pty Ltd, 37-43 Alexander Street, Crows Nest. NSW 2065, Australia. Tel: (02) 439 5133. Tlx: COMWOR AA74752. Fax: (02) 439 5512.

MELBOURNE OFFICE:
Computerworld Pty Limited, 74-76 Eastern Road, South Melbourne, Vic 3205. Tel: (03) 690 2933. Tlx: COMWOR AA33926. Fax: (03) 690 4362.

Communications World is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 80 computer publications in more than 28 major countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: Argentina's Computerworld Argentina, PC Mundo; Asia's Communications World, Computerworld Hong Kong, Computerworld Indonesia, Computerworld Malaysia, Computerworld Singapore, Computerworld Southeast Asia, PC Review; Australia's Computerworld Australia, Australian PC World, Australian Macworld; Austria's Computerwelt Oesterreich; Brazil's DataNews, PC Mundo, Micro Mundo; Chile's Informatica, Computacion Personal; China's China Computerworld, China Computerworld Monthly; Denmark's Computerworld Danmark, PC World Danmark; Finland's Mikro, Tietoviikko; France's Le Monde Informatique, Distributique, InfoPC, Le Monde des Telecoms; Greece's Micro and Computer Age; Hungary's Computerworld SZT, Mikrovilag; India's Dataquest; Israel's People & Computers Weekly, People & Computers Biweekly; Italy's Computerworld Italia; Japan's Computerworld Japan; Mexico's Computerworld Mexico; The Netherlands' Computerworld Netherlands, PC World Benelux; New Zealand's Computerworld New Zealand; Norway's Computerworld Norge, PC World Norge; Saudi Arabia's Arabian Computer News; South Korea's Computerworld Korea, PC World Korea; Spain's Computerworld Espana, Commodore World, PC World Espana, Communicationes World, Informatica Industria; Sweden's Computer Sweden, Mikrodatorn, Svenska PC World; Switzerland's Computerworld Schweiz; United Kingdom's Computer News, DEC Today, ICL Today, PC Business World; United States' Amiga World, Boston Computer News, CD-Rom Review, Computerworld, Computers in Science, Digital News, Federal Computer Week, 80 Micro, FOCUS Publications, inCider, InfoWorld, MacWorld, Computer & Software News (Micro Marketworld/Lebhar-Friedman), Network World, PC World, Portable Computer Review, Publish!, PC Resource, Run; Venezuela's Computerworld Venezuela; West Germany's Computerwoche, PC Welt, Run, Information Management, PC Woche.

International Marketing Manager: Frank Cutitta

Reproduction of material appearing in *Communications World* is strictly forbidden without written permission. Computerworld Pty Limited is the sole and only licensee to material appearing in publications of CW Communications Inc and any unauthorised use of material appearing in these publications will be actionable by Computerworld Pty Limited as a breach of copyright. Copyright 1987 by Computerworld Pty Ltd.

Communications World is published monthly and distributed to qualified charter subscribers in the communications industry.

Printed by Offset Alpine Printing Pty Ltd.
Silverwater. NSW.

A PUBLICATION OF COMPUTERWORLD

PS/2 graphics thrust tipped to hit networks

By Philip Arst

WITH all the attention given to the "clone killing" aspects of the new IBM Personal System/2 series' graphics enhancements, users have taken little notice of its impact on data communications network requirements. The data communications interface options IBM offers with these products will bring a smorgasbord of interface and support capabilities to today's networks. These interfaces to today's conventional facilities support many major standards, and IBM has indicated its willingness to support others.

It is curious, however, that IBM announced Baseband PC Lan, a new, non-standard 2M-bit/sec baseband local area network that uses carrier-sense multiple access with collision detection, as its entry-level local net. Is IBM again playing the game of doing everything its own way, or is there a reason behind this? The answer is yes to both questions. Virtually all low-speed local networks (such as the 1M-bit/sec Starlan) are inadequate to handle the new graphics capabilities of the highend Personal System/2 models. IBM needed something better.

Two graphics boards, MCGA and VGA, are offered with the Personal System/2 series, with four levels of graphics representation supported. These new resolutions require from 307,000 to 1,224,000 bits to represent a full screen graphics display. By contrast, the IBM Personal Computer's full screen display of 1920 characters uses only 15,360 bits to represent a full screen.

With Personal System/2 graphics, the total bits required to refresh the screen has grown 20 to 80 times the current message size, and the end is not yet in sight. A current IBM Personal Computer-compatible product, Princeton Graphics Systems' 3XX series monitor, requires approximately two million bits to refresh its monographics screen — a 100-fold increase in message size. Add 10 per cent to the above bit counts for communications overhead and users have a whole new ball game in data communications.

> *'The best alternative right now is satellite networking via interactive Vsats'*

Fortunately for today's network manager, IBM's software is several years away. Although Apple has pioneered graphics and is making considerable inroads in business office markets, the widespread use of full-page graphics capabilities on IBM Personal Computers will take time and certainly would not replace many simple transaction applications. Nevertheless, new applications in scanned document and image retrieval are already in limited use, and, with the Personal System/2 and Macintosh, those applications will move into the general market.

The IBM Baseband PC Lan now comes into perspective. The bandwidth required to transport such large screen refresh messages in bit-map mode provides a reason for abandoning proposed, 1M-bit/sec standards such as Starlan and going to the 2M-bit/sec Baseband PC Lan for departmental applications. But why did not IBM go with thin-wire Ethernet, which, in contrast to the new IBM offering, is here now, works well, is installed by a large number of potential customers and is a worldwide standard? This is just another example of IBM doing something different to create its own de facto standard.

Possibly the most profound impact of the Personal System/2's sanctification of graphics is in wide-area networks. Today's terrestrial networks lack quick screen-refresh capabilities, except for expensive high-speed links between major plants. Certainly no cost-effective coverage of several hundred outlying branch offices is available at these bandwidths via terrestrial networks,

The best alternative right now is satellite networking via the new generation of interactive very small aperture terminals. These devices, when properly integrated into a network, can allocate the high bandwidth needed among hundreds of remote stations on a burst mode (such as packet) basis, thereby providing the performance needed for high-resolution graphics at an affordable price.

Much work is still needed to adapt today's Vsats to this graphics environment and to provide methods of integrating Vsats, M2 services and other appropriate transmission services to solve the bit-mapped graphics transmission problem. Data compression techniques and the adoption of graphics definition language communications standards will offer some relief to these message-size requirements.

For local-area network users who cannot wait, Apple is a good choice for graphics networking: It already has its graphics standards act together with its Appletalk network and Postscript graphics communications language. But if you intend to run graphics via the Personal System/2 now is the time to upgrade to high-capacity local nets or satellite networking, so as not to render networks installed today obsolete before they are even in use.

3Com runs Ethernet at 10M-bit/sec over phone

SANTA CLARA, California — 3Com Corp has given industry analysts a first look at its 10M-bit/sec Ethernet, running over standard telephone wiring. 3Com officials said the product was in beta testing and would be available for sale by the end of 1987. No prices were announced.

"This is our most important hardware development since thin Ethernet in 1982," said Bill Krause, 3Com's president. "What is significant here is not just that we are able to run 10M-bit/sec Ethernet over twisted pair, but that we are able to run it over telephone wire — the worst wire imaginable for high-speed data transmission."

In 3Com's demonstration, two 3Station workstations were connected in series by thin Ethernet cable to an adapter box that replaced a normal telephone outlet. This adapter box had two outlets — an RJ-11 telephone jack and a BNC co-axial jack. 3Com said the transceiver contained in the adapter box was connected by normal telephone wiring to what was referred to as a "concentrator" in a telephone closet 150 feet away, then connected through another 150 feet of telephone wire to a 3Server3 file server across the room.

3Com said high-speed transmission is made possible by patented technology in the system transceivers, which operate "near the edges of the Ethernet specification," featuring higher-than-usual output voltages and receiver pre-compensation to reduce line noise. All 3Com products are said to work with the telephone wiring setup without modification.

Analysts say this will eliminate some hidden major costs in an Ethernet installation — the labor involved in pulling coax. Some other Lans, such as AT&T/Olivetti's Starlan, also use twisted pair cabling. "But Ethernet is considerably faster," one industry expert said.

Servers set to soar

(Continued from page 1)

68000 microprocessor or IBM Personal Computer AT base; and minicomputers used as servers.

Users with small networks of six to eight nodes tend to use IBM Personal Computer ATs and compatibles for servers, said Bob Clark, vice-president of Seybold's Consulting Division. For these users, "dedicated servers are not very important," said Clark. nodes, an IBM Personal Computer AT becomes impractical as a server. "You need more processing power," said Clark. Likewise, mini-computer-based solutions are impractical for most users because they are expensive, said Gold.

For the immediate future, the mid-range of the market — the dedicated server — is where most action will take place, industry watchers and participants agreed.

Several forces are driving the increasing use of dedicated servers. Technological advances, including the advent of Intel's 80386 microprocessor and new disk drive controllers, allow server makers the chance to "leapfrog" current server technology, said Mark Calkins, director of corporate marketing and development for Novell.

Users are also shaping the evolution of servers. "As users demand more functionality from local network environments and move to tie local networks together or to access a public packet-switching network, the server is going to be the logical place to combine these functions," said IDC's Gold.

Servers with uninterruptible power supplies, as well as servers capable of automatically archiving data on to optical disks, are coming, according to Novell's Calkins. However, rather than combining more functions on a single server, Novell is looking to maintain the distributed nature of local networks by offering multiple servers.

"We take the approach that we'd rather have a communications server that integrates X.25, asynchronous and IBM [mainframe] communications with remote bridging in one box, but keep it separate from the file server," Calkins said.

He said he anticipates file serving will be separated from print serving as more users choose to secure servers behind locked doors, but look to maintain easy access to print servers.

Banyan Systems' vice-president of business development, Anand Jagannathan, said he believes the key issues of server technology are "being able to run software like a database management system or communications software on the server, and that server functionality should be portable so a vendor can have a family of servers". Banyan's use of Unix, a relatively portable operating system, as the basis of its Virtual Networking System (Vines) gives the company an edge, Jagannathan said.

"Over time, we can integrate more and more Unix applications as part of our server," said Jagannathan. In addition, Banyan will be able to run Vines on commodity 80286-based personal computers, its own dedicated servers, and minicomputer-style machines.

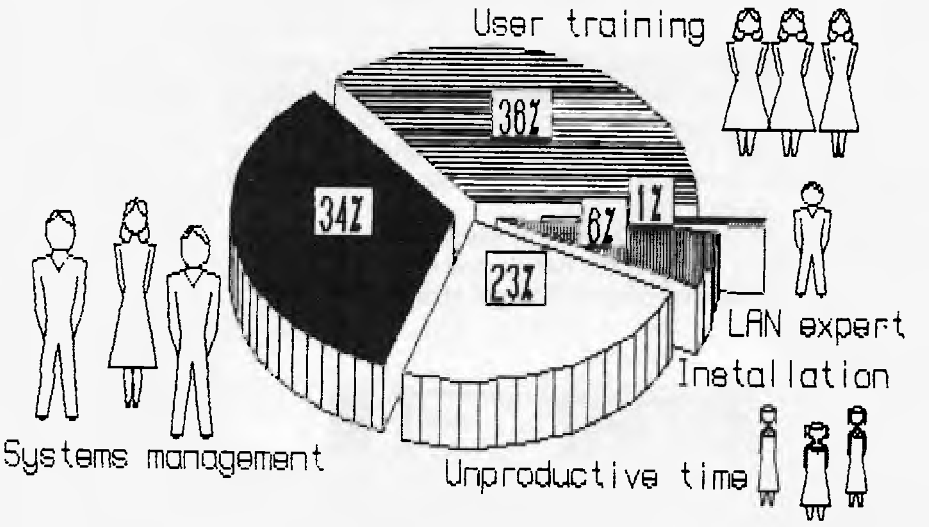
3Com favours implementing additional server functions in software. "People like to buy one server and be done with it, but people don't mind buying more software," said a company spokesman.

As a result, 3Com is considering supporting different operating systems — possibly one for the lowend of the market and another on its dedicated server.

Unlike Banyan and Novell, 3Com's server does not have slots for addon boards, so it cannot support multiple network interface cards or other communications cards.

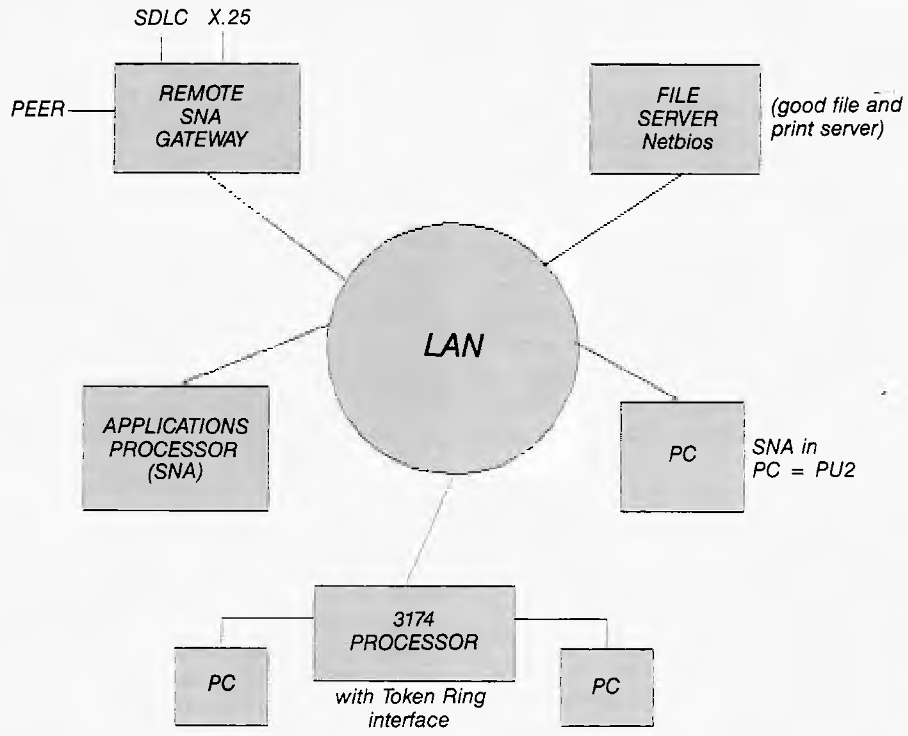
Overall, users can look for more differentiation among server products in the next few years. Pricing at the lowend of the market will continue to be extremely competitive. Dedicated servers will sport new, or newly integrated, functions. And vendors such as Digital Equipment Corp, IBM, Wang Laboratories and even Tandem Computers will increasingly promote minicomputer server solutions.

The real cost of Lans



Source: The Ferrin Corp. Graphic: Luis Huesch & Associates

The PC work group a la IBM



Netlink CEO Paul Wood mapped out IBM's desktop communications strategy at the recent *Computerworld* Comnet series of seminars. He predicted that SNA-to-802.2 links would be used for all communications-related functions while Netbios would be used for local file and printer server access.

His predictions for SNA-PC directions included the forecasts that

- **SNA in the PC will use a standard link interface (802.2 DLC), regardless of media type.**
- **SNA will be used for both host access as well as peer connections to other PCs or departmental processors.**
- **There will be multiple application interfaces, converging on LU6.2 APPC, and probably an OSI standard.**
- **Netbios will remain viable and use 802.2 DLC to access file servers, and so on.**

Source: Netlink

Startup Sunriver claims fibre link breakthrough

NEW YORK — A US startup company has unveiled what it claims is a new concept in workgroup computing, combining 80386-based systems with high-speed fibre-optic links for use with multi-user, multitasking operating systems.

Sunriver links diskless workstations via fibre-optic cable to an 80386-based microcomputer enabling each to function as a separate 386-based personal computer as much as 1000m from the host. By using a fibre-optic link, the diskless workstation can exchange data with the host at 32M-bit/sec, Sunriver claimed, an order of magnitude greater than the 19.2K bit/sec data rate of conventional dumb terminals.

The company said its approach lends itself well to a variety of multi-user applications in which speedy interaction between host and workstation is required and that it is particularly well suited to generating business graphics — an application that depends on the greater processing power and larger memory capacity of 386-based micros.

"Our approach allows the 386 to distribute its processing power over the user base, providing for true multi-user and multitasking functionality," said William Long, Sunriver's president and chief executive officer.

A 386-based host in a Sunriver system reportedly supports a variety of multi-user, multitasking operating systems, including VP/IX and Merge 386, in which Unix runs as a task under MS-Dos; Flexos 386 and PC-Mos/386 — multi-user operating systems that emulate MS-Dos — and 386/IX and System V/386, Unix implementations for the 80386.

On a per-user basis, Sunriver's multi-user system is between 25 per cent and 50 per cent cheaper than either conventional PC networks or 80286-based multi-user micros, the company claimed.

Sunriver is offering four diskless workstations featuring 14in displays; a variety of color bit-mapped graphics support capability; one parallel and two serial ports; a 101-key IBM Personal Computer AT-style keyboard; and an AT sound chip and speaker. Available in the US in October, the workstations range in price from $US1599 to $US2299.

A $US800 adapter board for a 386-based micro with an AT bus facilitates the attachment of up to four of the diskless workstations via fibre-optic cable. Since AT-class machines offer three 16-bit slots, up to 13 workstation, including the host, can share the resources of the 386-based micro.

Sunriver will also offer a $US800 adapter card to allow an IBM PC or compatible to function as a 386-based microcomputer. It intends to offer an adapter for IBM's PS/2 family that uses IBM's Micro Channel bus and will develop fibre-optic links for systems using the Multibus and VME-bus architecture.

The company said it plans to sell its products through OEMs and value-added resellers. It already has an OEM deal with SCI Systems.

WORKSTATION INVASION

By James Connolly

FRAMINGHAM, Mass — The scenario that has personal computers migrating into application areas served by more costly and complex systems has taken a bizarre twist.

It is easy to see how standalone and networked PCs based on 80286 and 80386 microprocessors meet user needs previously addressed by 16-bit minicomputers and how those PCs can handle more work previously done on mainframes.

But the makers of engineering workstations have been modifying that script by suggesting a new class of computer will squeeze the standard PC from above.

Those vendors, such as Apollo Computer, Sun Microsystems and Digital Equipment Corp hint that their high-powered CPUs and graphics display stations can replace PCs as the price gap narrows between the two types of systems.

The vendors dropped the hints as they slashed their entry-level, diskless workstation prices to below $5000, which pits those products against the upper half of the PC class — although it is obvious $5000 buys a more fully configured PC than engineering workstation.

Major differences still exist between workstations and general-purpose PCs in terms of price and application. Workstations are cheaper than ever, but there are still relatively few micro users who need to jump to a 68020-based workstation.

But workstation vendors may not be too far off base when they toss out comments such as those Apollo officials did when they said they would place a workstation on every professional's desk, or as DEC executives promote their Vaxstation 2000 as a terminal on a larger Vax.

Workstations are expanding their marketing appeal beyond computer-aided design and engineering. The systems appear in areas such as finance houses and technical publishing and now run general-purpose IBM compatible software. Analysts note that the workstations were designed from the beginning for communication with each other and with larger systems in a corporate environment, which is an advantage in comparisons with PCs.

True, Apollo and other 68020-based vendors have yet to prove they can make it in the PC business.

But there is also something familiar in the hints about replacing PCs. The concept of placing a high-powered workstation on everyone's desk may be no more bizarre than the idea of replacing dumb terminals with intelligent PCs sounded five years ago.

And PC makers are offering products that incorporate more and more of the features found in workstations. IBM's 80386-based Personal System/2 Model 80 has CPU power and a base price comparable with an Apollo, Sun or DEC workstation.

▶TELETOONS — By Phil Frank

I'm afraid there's been a misunderstanding. There's no TOLKIEN-RING network here.

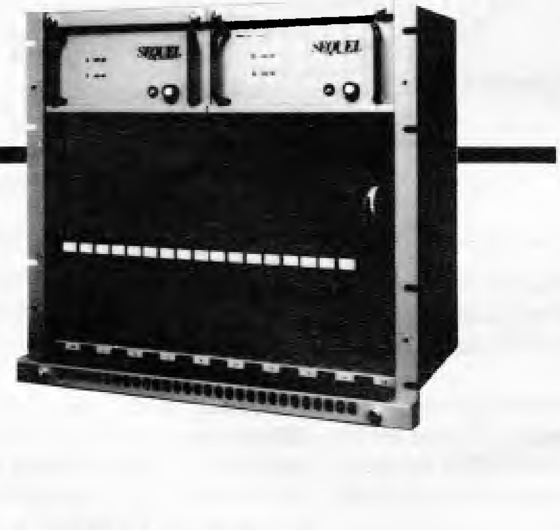
A full function data PABX for the smaller network user

Now you don't have to run a large network to justify an electronic network control and switching system.

The Sequel Data PABX can be configured with as few as six ports, as many as 1536 ports or almost any number in-between - And still be cost justified.

Sequel gives you all the features of a large system without the high cost. You get centralised terminal based configuration of your network, automatic camp-on for busy ports, simulataneous connection to multiple ports, full electronic patching and much more. You can even add optional automatic call-back security to protect your sensitive data.

So, if you've got a small to medium network stop fiddling around with cable based patch panels and the like. Take a look at Sequel and get real flexibility at the right price.



DATAMATIC

Sydney (02)888 1788 Melbourne (03)818 0674
Adelaide (08)363 0844 Brisbane (07)290 1599
Perth (09)382 1744 Canberra (062)80 5033

Banyan pumps up power of servers

By David Strom

SAN DIEGO — Banyan Systems will this year strengthen the ability of its Vines hardware and software to create wide-area networks, expand support for both OSI and IBM protocols and pump up the power of its servers.

The product enhancements will include upgraded hard disk capacity of Banyan's dedicated-server machines, Mary Kirson, Banyan's director of marketing, told a user conference.

The Network Server will increase from 480M-bytes of data storage to 2G-bytes, and the Desktop Server will expand from 120M-bytes to 720M-bytes, said Kirson.

Vines versions

Two new versions of the company's network-operating system software, Vines, (which stands for Virtual Networking Software) will be released this year, according to Kirson; one immediately and one late this year.

The first version will expand support for file servers that run the new 3Com Etherlink 3C505 network-adapter card, a high-performance Ethernet card that runs at 10M-bits/sec.

Also available in the first version is support for both workstations and servers that run Proteon's Pronet-4 token ring network adapter.

Both versions of Vines 2.1 will allow the same tape-backup system used in Banyan's dedicated file servers to be attached externally to any 80286-based compatible machine that runs the Vines/286 software.

The second version of Vines 2.1 will support all models of the new IBM Personal System/2 micros as workstations, and the Model 50s and 60s as Vines/286-based file servers.

"We need to change Vines to run with the new IBM PC Lan Support software," said Anand Jagannathan, vice-president for business development at Banyan.

Vines 3.0 is also scheduled to be delivered this year and will include three special tool kits that will allow software developers to write their own applications.

Three tool kits

The three tool kits are for developing distributed databases, Lan-based electronic-mail applications and Lan-based LU 6.2 applications. "This allows third parties to develop their own applications that will run on all supported servers," said Kirson.

Vines 3.0 will also offer at least a tenfold increase in performance, along with additional "mainframe-like" security features, according to company representatives at the conference.

This version of Vines will also offer implementation of LU 6.2 capabilities across all Banyan networks. "Our version of LU 6.2 will be a full implementation", said Kirson. "This includes support for all command verbs as well as for PU (Physical Unit) 2.1."

Future versions of Vines beyond 3.0 will expand support for IBM standards to embrace IBM's Document Interchange Architecture, company officials said.

This means that Lan-based communications can work as intelligent gateways to IBM's host-based Distributed Systems Support (Disoss) electronic-mail users.

Cautious reaction to PC Network 1.2 performance

By Elisabeth Horwitt

PASADENA, California — IBM's PC Network program version 1.2 offers significant performance improvements over the older version 1.12, but only in limited areas and for certain types of applications, according to a series of tests performed by an independent consulting company.

The tests by Interconnect Network Consulting Group found that the overall speed of workstation-to-server communications improved by as much as 840 per cent when the newer PC Network program was used. But it said that in most cases, network throughput would show only a 5 to 10 per cent improvement.

In some types of exchanges, such as read and write overlays of 512-byte records, throughput was actually slower with the new version of the program, the tests found.

Bruce Robertson, Interconnect's manager of products and services, and Judy Savage, manager of network engineering, conducted the tests at the headquarters of Network General Corp, developers of the Sniffer protocol analyser.

Robertson and Savage first compared the two network programs' overall performance through two widely used benchmark tools: the PC Magazine Bench Program and the Novell Perform Utility.

Next, using Sniffer, the consultants attempted to isolate the causes for network performance differences by looking at packet activity on the network.

Tests showed that version 1.2's buffer held 4K-bytes, compared with version 1.12's 512 bytes. The increased buffer space allowed a personal computer to collect multiple 512-byte records and send them in a batch, cutting down on the number of network transmissions.

This feature made a significant difference only during transfers of small records. however. During the PC Magazine test, version 1.2 also demonstrated a 75 per cent performance increase over version 1.12 for sequential file writes and reads involving 512-byte records.

But when 4096-byte records were sent, the newer version upped overall throughput by only 5 per cent for sequential file writes and 11 per cent for sequential file reads.

These results made the buffer's increased size less significant, Savage said, "because most records are 2K-bytes or larger". Version 1.2's larger buffer could be a drawback, since "waiting for the buffer to fill unnecessarily could even impede performance with small files," Savage said.

For example, version 1.2 performed worse than version 1.12 in the Novell test for both read and write overlays involving 512-byte records.

There is no need to load multiple records into a buffer during an overlay, since the same record is being repeatedly written to, or accessed on, the server's disk, Interconnect said.

IBM has also improved the program by cutting down on the number of packets needed to transfer a given amount of data over the network. Sniffer indicated that version 1.2 used only 16 packets to write a 4096-byte record to disk, while version 1.12 used 24 packets.

> *'The new program still has a long way to go'*

Although cutting down on packets did not significantly improve throughput when network traffic was light, "it could make a big difference in throughput on a heavily loaded network by significantly reducing interrupts and data handling on the server," as well as saving on bandwidth utilisation, said Network general president Harry Saal.

In previous tests by Network General, Sniffer found that version 1.12 tended to waste time and bandwidth with unnecessary exchanges between the PC and the server, asking repeatedly for the same group of bytes when they had already been sent.

The new PC Network program has "cleared away some of that repetitive asking, but it still has a long way to go," Saal said.

During tests of version 1.12 by the Interconnect consultants, Sniffer sensed at one point during 512-byte random file read that no network activity was taking place.

"We realised the problem was that the program was reading the same file into Ram over and over," Savage said.

With version 1.2, which showed a 54 per cent improvement over version 1.12 in the same test, IBM has eliminated some — but by no means all — of these unnecessary loops and exchanges, the consultants concluded.

"IBM has increased performance in the PC Network program significantly in certain specific areas and uses more state-of-the-art techniques in handling packets. However, in an actual user environment, the overall throughput improvement will only be moderate," said Mark Freund, Interconnect vice-president of design and engineering, who took part in the analysis.

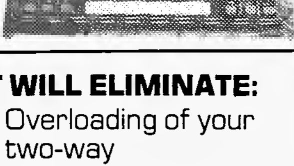
The tests measured throughput for an IBM PC doing various types of disk access on a Compaq Portable III file server across a PC Network.

■ **Desktop communications continues on page 25**

Irma runs to LU6.2

CALIFORNIAN vendor Network Software Associates has introduced software products said to allow IBM PCs and compatibles with Irma boards to communicate via IBM's LU6.2 and Remote Job Entry (RJE) protocols. Adapt 3274 LU6.2/I is reported to allow the PC to communicate with a mainframe using LU6.2/Advanced Program-to-Program Communications (APPC) functions via an IBM 3274 or 3174 cluster controller. Adapt3274 RJE/I emulates an IBM 3770 RJE workstation. It is said to allow Irma-equipped PCs attached to a 3274 or 3174 controller to communicate with an IBM mainframe running JES, Power or another Vtam operating system. Adapt3274 LU6.2 2/I costs $US485; Adapt3274 RJE/I costs $US985.

RADTEK FOR BETTER FLEET CONTROL



If your operations link is two-way radio, RADTEK can transform it into a communications system.
RADTEK manufacturers world-class mobile data communications systems.
When teamed with your two-way radio, RADTEK's system will bring new levels of efficiency and effectiveness to your transport operation.
RADTEK enables base-mobile-base transmission many times faster than by voice.
All messages are received as hard copy or screen display - a great help to all drivers.
Base will have an instant summary of all jobs on-screen which means that the most precise service parameters can be applied.
Of course, most importantly, the RADTEK Communications System ensures complete security of transmission.

IT WILL ELIMINATE:
- Overloading of your two-way
- Voice misunderstandings
- Delays through unattended mobiles

YOU'LL GET:
- Faster service to clients
- Better fleet control
- Quick, precise management information
- Greater fleet flexibility

DON'T RADIO YOUR BUSINESS - RADTEK IT!

RADTEK
corporation limited

18 PROWSE STREET, WEST PERTH. W.A. 6005

PERTH PHONE: (09) 322 4955
SYDNEY PHONE: (02) 957 4278 or (02) 922 2088
MELBOURNE PHONE: (03) 241 4033

Nets converging on control

By Joseph Fernandez

The increase in complexity and sophistication in networking has meant that tighter controls and standards are needed — independent suppliers can change their products if they plan for this in advance.

THE PAST 10 years have seen a great increase in the sophistication and complexity of networking. Increased complexity has brought a realisation that major areas of networking need to be based on a formal architecture, rather than being developed in an ad hoc way as in the past.

The greatly increased complexity of today's networks has also created a need for automated network management. As a result of these two factors, major suppliers are focusing their attention on development of an architecture for network management.

A communications architecture should define:

- The set of functions to be satisfied.
- The technical concepts on which the architecture is based.
- The logical entities that support these concepts.
- The communications protocols used by these entities.

An architecture should not dictate a particular physical implementation of the functions. The purpose of having an architecture is to separate the physical implementation from the conceptual basis. This allows a variety of innovative physical implementations to be created and to inter-work. It solves the major user requirement in the rapidly changing field of networking — that is, to be able to take advantage of advances in technology that are always occurring, while retaining compatibility with existing systems.

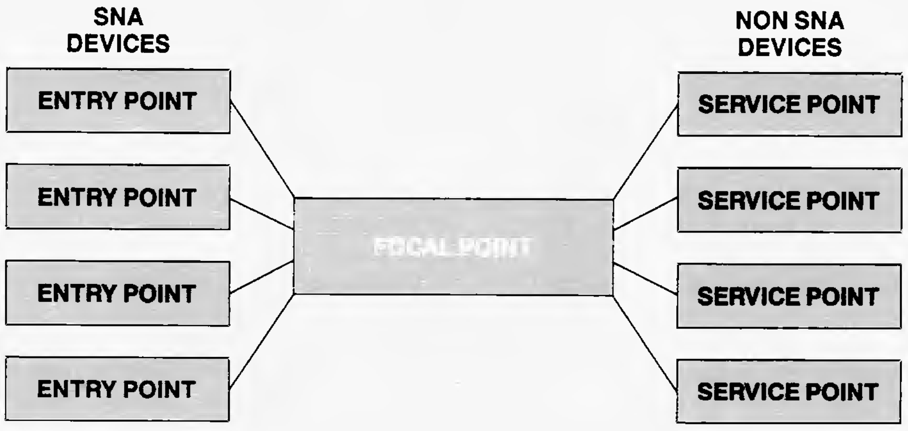


Figure 1: IBM's Network Management Architecture.

Architectures for network management potentially could be defined by a number of different organisations. The International Standards Organisation has, during the past 10 years, been defining the Open Systems Interconnection (OSI) architecture for computer communications; network management is a very important facet. IBM's Systems Network Architecture (SNA) has become a de facto standard for many communications equipment vendors. Digital Equipment Corp with its Digital Networking Architecture has a very large base of installed networks.

The CCITT has developed an architecture for the Integrated Services Digital Network (ISDN) and has published extensive standards both in this area (the I series) and in other areas of networking (the V, G and X series). Vendors of packet switching networks, such as GTE Telenet and Tymnet, have installed large networks worldwide.

IBM announced its network management architecture last September and has since published its specifications; it has stated that the architecture is intended to support multivendor networks.

The OSI committee has begun the task of defining OSI Management Services. However, it is only just developing draft proposals for the concepts, and it will be some time before an agreed standard emerges.

ISDN standards for user-controlled network management are also not likely to appear for some time. The standards defined to date have been for the access interfaces, and to some extent for signalling across an ISDN. An ISDN reference model has been developed, closely based on the OSI model. Network management may therefore follow the OSI approach.

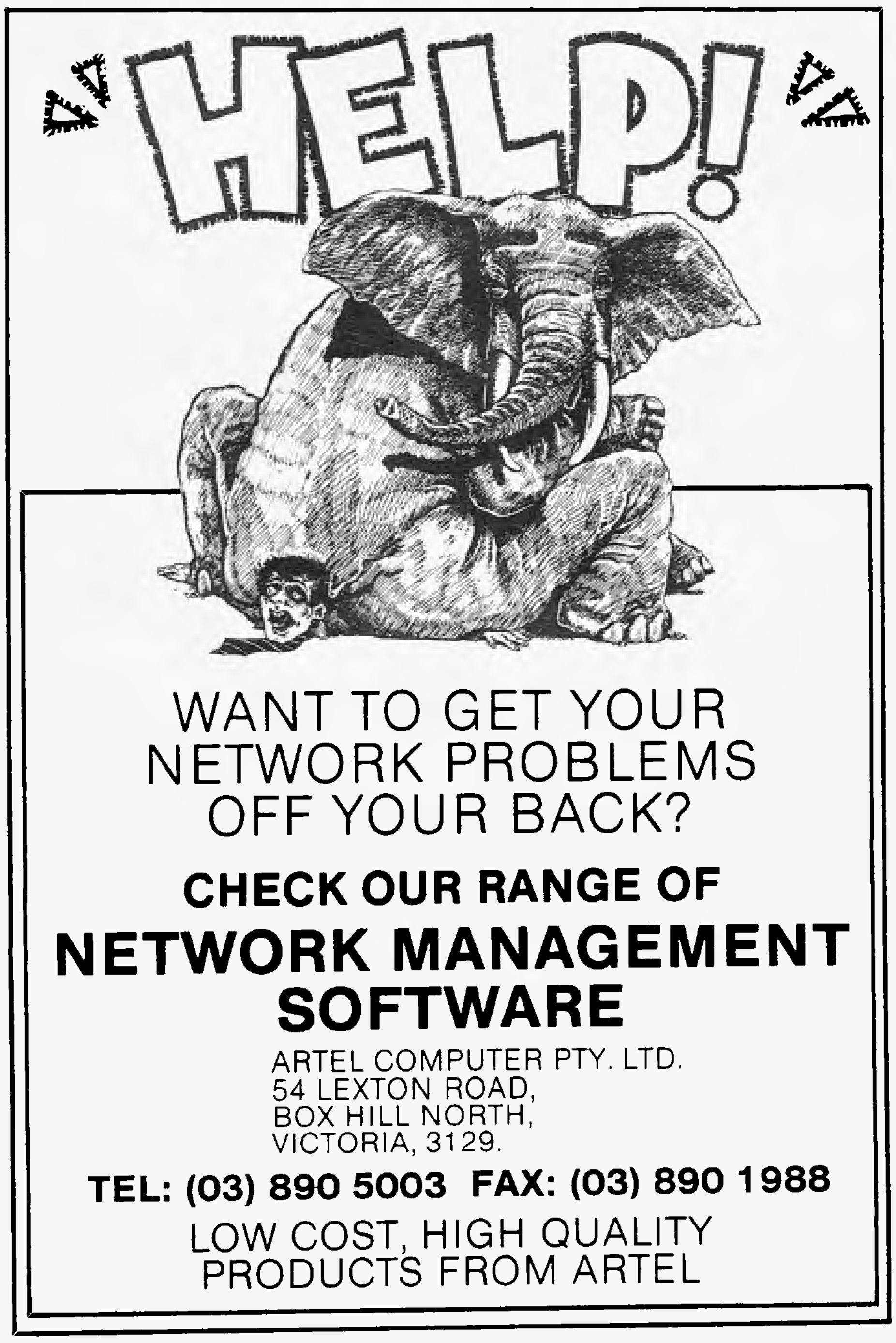
However, it has to take into account the fact that there is a fundamental difference in philosophy, with the ISDN passing control information out-of-band from user information. The pattern of usage of ISDN is likely to follow that of today's public packet-switching networks: ISDN will be used when and where the tariffs make it attractive, mostly as a carrier medium, with large users building their own private networks over ISDN circuits.

Network users will want to have integrated management of the circuits, their interfaces, and the user communications equipment.

The vendors of packet-switching networks have all developed proprietary network management schemes. No-one has a large enough installed base to be able to create a standard for network management architecture.

DEC has developed network management facilities as part of its Decnet product that implements Digital Networking Architecture, but has not defined and published an architecture for multivendor network management. DEC is committed to migrating Decnet to OSI. However, since it will be some time before OSI network management standards emerge, it is likely that DEC will develop its own architecture in the interim, and use this to influence the OSI direction.

(Continued page 14)



WANT TO GET YOUR NETWORK PROBLEMS OFF YOUR BACK?

CHECK OUR RANGE OF
NETWORK MANAGEMENT SOFTWARE

ARTEL COMPUTER PTY. LTD.
54 LEXTON ROAD,
BOX HILL NORTH,
VICTORIA, 3129.

TEL: (03) 890 5003 FAX: (03) 890 1988

LOW COST, HIGH QUALITY PRODUCTS FROM ARTEL

The do's and don'ts of a top investment

Many companies today are either experimenting or beginning to use comprehensive network management systems. Too few organisations, however, are applying sound business management principles to what is fast becoming one of their most *significant investments,* argues Brian Fincham, and presents a check list of management do's and don'ts.

BECAUSE the network depends upon so many aspects for its smooth functioning, the network management umbrella must include operational control, problem diagnosis and recover, availability and performance measurement, capacity planning and change and inventory management.

The services which the network has been designed to deliver must be quantified and agreed with their users. Network management must interpret and report on what is achieved against those targets. Information about the network's performance must be readily available.

Where online access to reporters can be provided, it should be achieved without the need for complex log-on procedures, as it is desirable to encourage users and interested parties, particularly senior management, to view the information directly.

In this situation, a high level of summary information should be provided on the initial screens, with the option to cascade into further levels of detail where required. The suitable use of color and graphics in the presentation can greatly assist the viewer to identify exceptions.

It is important that time is invested to determine that the information recipients really need to ensure that reports contain *only relevant data* and that unnecessary processing is minimised.

Priority must be given to establishing tools which enhance the operation of the network. Automated diagnostics and recovery from predictable failures are possible today using available proven technology, and the proper use of these can greatly reduce the operators' workload and maximise systems availability.

Dependence upon operator interaction with the network system must be minimised. Messages can be given priority and graduated to ensure that important ones are handled before those which only contain non-critical information. This moves the operation closer to the point where it acts on messages received from the network, rather than waiting for a user's call. Additional benefit can be gained by predetermining operational responsibilities.

Network operators, planners and administrators all require access to accurate inventory and configuration records to function properly. The configuration must reflect both temporary and permanent changes. What of tomorrow's needs?

- The network operator must increasingly be able to access more complete information about the overall operation from a single workstation.
- The network management system must be able to monitor and control all lines and devices in the network.
- Control of the network must widen to in-

(Continued page 17)

Who's making waves in the IBM marketplace?

NET/MASTER

An integrated management tool for Networking and Operations

Before you can manage your IBM system you need to present it efficiently to the users.

Software Developments has taken the potentially complex environment that exists when you communicate with your IBM or Fujitsu system and produced a clear interface, NET/MASTER.

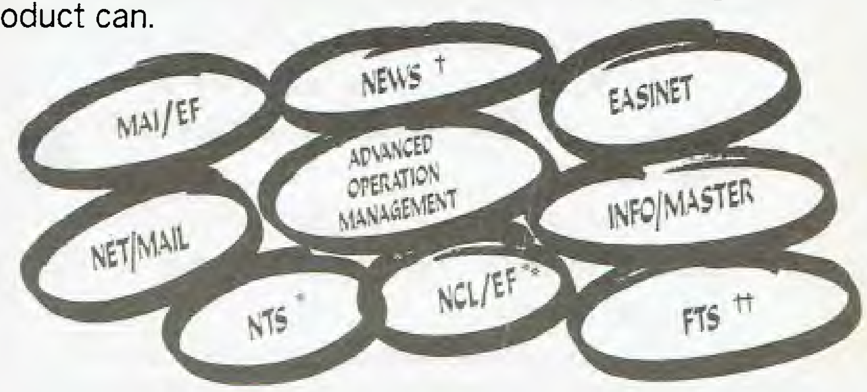
Enhanced information access and system capability are made available to all network users; end-users, systems programmers, programmers and managers.

From initial logon, NET/MASTER works to increase productivity and police security levels. NET/MASTER tightly integrates with your current security system (ACF2 or RACF). The user is presented with authorised applications (EASINET) which, while in use, can be switched using MAI (Multiple Application Interface).

Communications can be sent in a freeform manner (NET/MAIL), broadcast instantly or stored on a bulletin board.

Tasks can be automated to a chosen level, relieving the productivity bottleneck experienced in managing systems and operations (Advanced Operation Management).

NET/MASTER efficiently manages your IBM or Fujitsu system, increasing productivity as only a truly integrated product can.



* NETWORK TRACKING SYSTEM
** NETWORK CONTROL LANGUAGE
† NETWORK ERROR WARNING SYSTEM
†† FILE TRANSMISSION SERVICES

COMPATIBLE WITH MVS/SP, MVS/XA, DOS/VSE, VM/GCS, MSP AND NIDOS OPERATING SYSTEMS.

NET/MASTER

SOFTWARE DEVELOPMENTS PTY. LIMITED
845 Pacific Highway, Chatswood, NSW 2067
Telephone: (02) 411 7200. Telex: AA73649. Fax: (02) 411 6764

SD

GUBB&ASSOC 0216

Better quality networks

(Continued from page 12)

This leaves IBM as the only one of the potential candidates which has defined and published a network management architecture intended as a multivendor standard.

The IBM manual *"SNA Management Services"*, published in March 1987, formally defines the functions, technical concepts, entities in a management services model, and communications protocols. This architecture is not a radical new development but rather a formalisation of protocols and concepts that have been used for some time by SNA devices and hosts.

What is new, however, is that IBM is formally giving the specifications the status of a "standard" to which independent hardware and software vendors can build products.

Along with the architectural announcement, IBM announced an implementation, Netview. This has since often been mistakenly equated with the network management architecture. It is important to distinguish an architecture from particular implementations: an architecture defines concepts and protocols that can be physically implemented in a variety of ways. This allow users to pick the most elegant physical implementation at any time, while retaining compatibility with existing or future implementations.

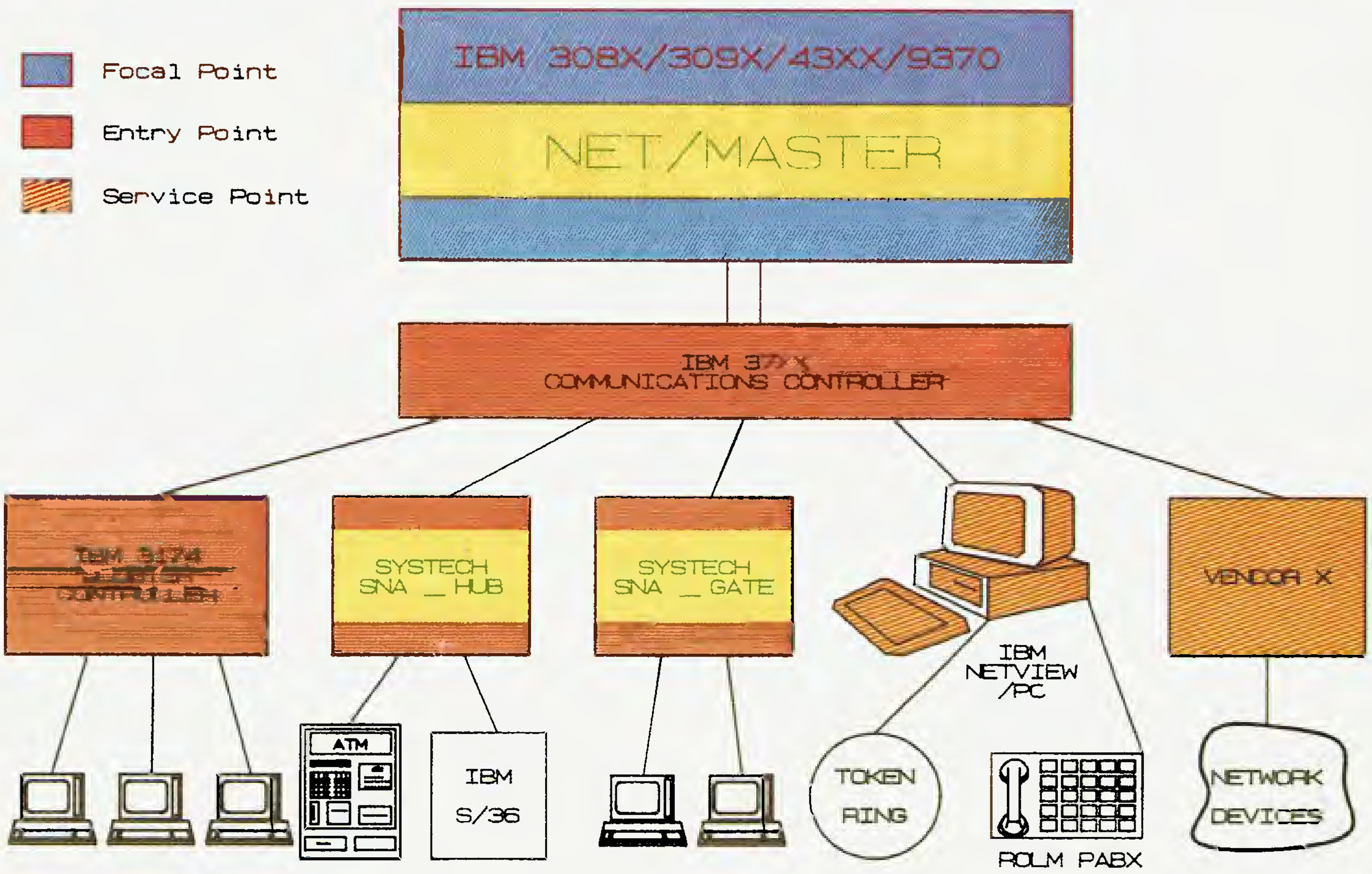


Figure 2: Example of an implementation of IBM's network management architecture.

There are four functions in the scope of the SNA Network Management Architecture — problem management, performance and accounting management, configuration management, and change management.

The architecture defines three entities: a *focal point*, an *entry point* and a *service point* (see Figure 1).

- A focal point provides centralised network management of all the other network components.
- An entry point provides local management of SNA devices under the control of a focal point, with which it communicates.
- A service point manages attached non-

(Continued page 15)

How safe is your future?

How important do you consider industry standards to be when selecting your PC network?

At 3Com we consider adherence to the Microsoft and IBM standards to be absolutely paramount.

Surprisingly other vendors don't follow these well accepted standards... and what's more they claim to be serious about networking.

If you're serious about the future and keeping your options open... 3Com 3+ — Solutions for the networking standards.

Did you know we've also signed a joint development agreement with Microsoft to develop the OS/2 LAN Manager?

☐ Please send me more information on the 3Com 3+.
☐ Please organise for a dealer to contact me.
Nominate preferred dealer: ____________
NAME: ____________
TITLE: ____________
COMPANY: ____________
ADDRESS: ____________ POSTCODE: ____________
Send to: Imagineering, 77 Dunning Ave, Rosebery NSW 2018.
IM057

3Com®

IMAGINEERING™
· 3COM DIVISION ·

77 Dunning Ave, Rosebery, NSW 2018. Ph: (02) 697 8666
Ground Floor, 51-53 Park St, South Melbourne, VIC 3205. Ph: (03) 690 9022
Unit 3, 249 Coronation Dr, Milton, QLD 4064. Ph: (07) 369 2911
Imagineering is a Division of Studio Australia Pty Ltd

Tighter controls for networking

(Continued from page 14)

SNA devices, again under the control of a focal point.

Figure 2 shows an example of an implementation an SNA Network Management focal point. the IBM 37XX and 3174 controllers implement entry points. The SNA hub and the SNA gate from Systems Technology implement entry points. The hub acts as a concentrator and switch of other SNA devices such as cluster controllers, IBM's small systems, ATMs, or ATM controllers.

The Gate is a protocol converter. IBM's Netview/PC is an implementation of an entry point and can communicate with an IBM Token-Ring or Rolm PABX. An independent vendor could produce a service point to interface other non-SNA network devices or networks.

The focal point exchanges network management information with the entry points and the service points using protocols defined in the SNA Management Services specifications. In fact, this communication is much simpler than is commonly believed, and it is worth looking at it briefly.

All records transmitted over SNA communications lines have the format shown at the top of Figure 3. This format will be very familiar to any implementers of SNA-compatible devices. The three headers and the trailer are inserted before transmission and removed at reception by the lower layers of SNA.

Consequently, a network management implementation only has to deal with records at the level shown in the middle of the figure. SNA Management Services specify one standard format of record, the Network Management Vector Transport, for virtually all network management functions.

As shown in the figure, this record is identified by a particular code in its first three bytes. The data part of the record contains information packed as shown near the bottom of the figure.

Implementation of the communications protocol of SNA Network Management Architecture basically comes down to handling this single record type, whose format is explicitly defined. Independent suppliers who develop this facility can then build extra value into their products by addressing the integration and presentation issues in innovative ways, without affecting their compatibility with SNA networks and products.

While SNA Network Management architecture is the only defined standard to date, it is unlikely to remain so. It has weaknesses, particularly in the lack of true peer network management. This is important for heterogeneous networks, which will become increasingly common.

Standards will probably gradually emerge from the OSI effort, DEC and the CCITT. The OSI and DEC ones are likely to address the same functions as SNA Network Management, but be built on peer concepts.

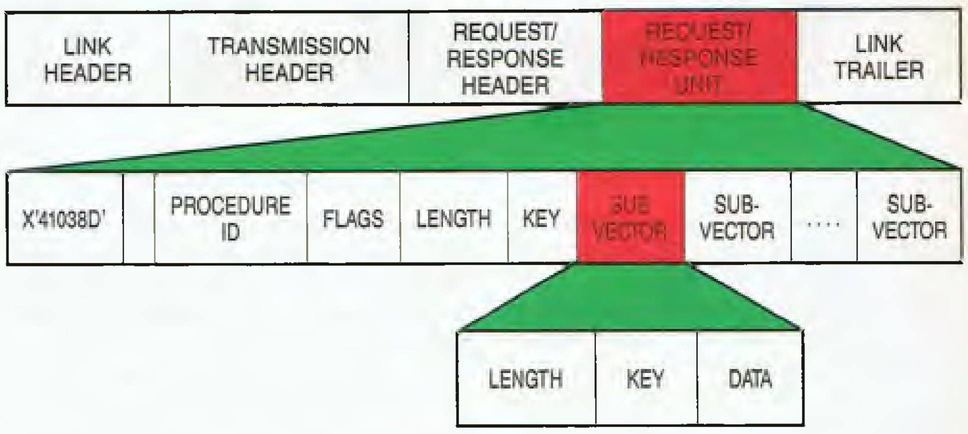


Figure 3: Format of an SNA Network Management Vector Transport (NMVT) record.

Independent suppliers which have developed network management products based on SNA Network Management Architecture can change their products to support the new standards as well, if they plan for this in advance. The major design requirement is to incorporate capabilities for a subsequent transition to a peer architecture, while implementing focal points and service points.

This strategy provides the dual benefits of support of the existing standard and accommodation of ones that may emerge later, if appropriate.

Joseph Fernandez is senior systems engineer with Software Developments Pty Ltd.

Subtlety needed

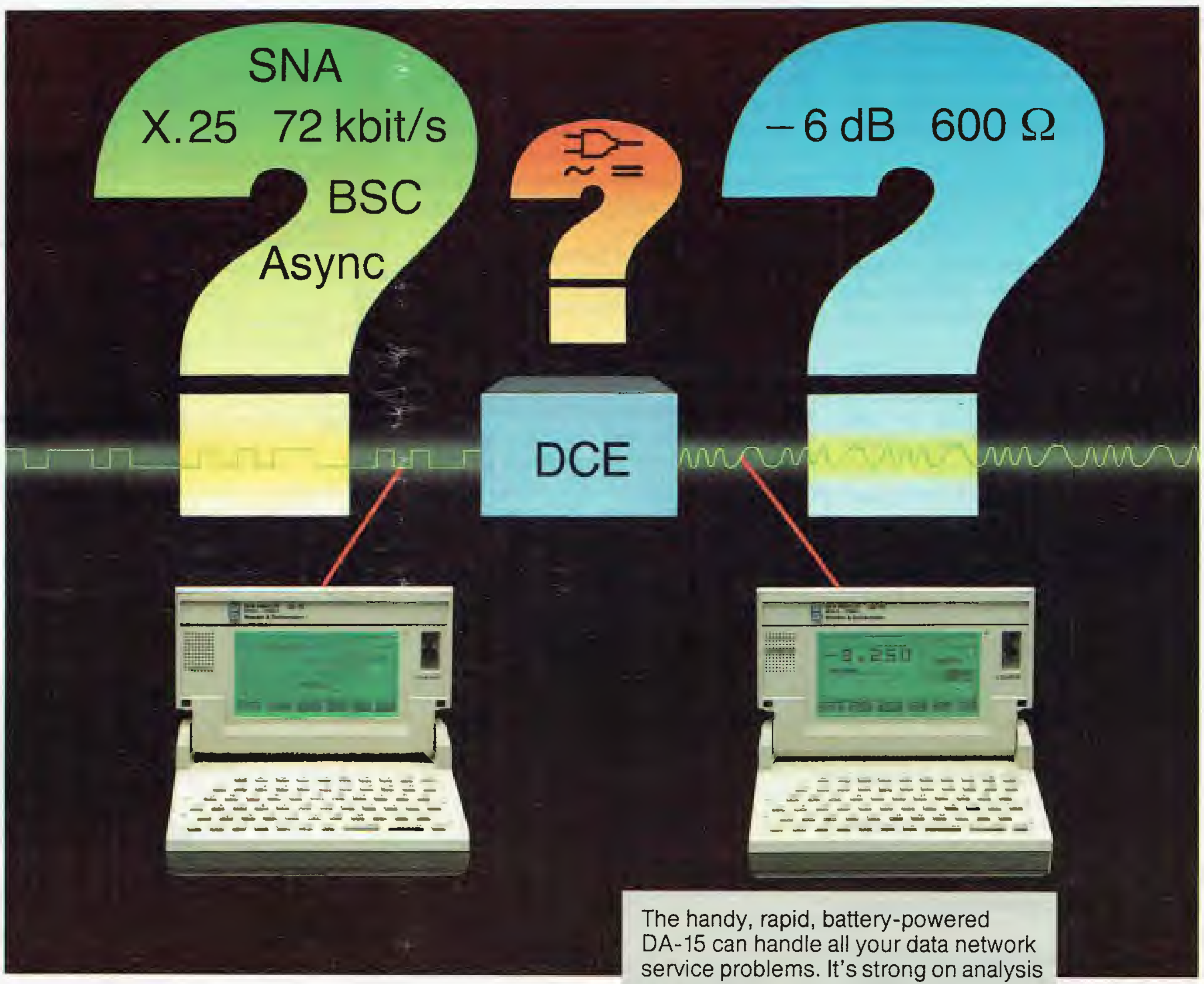
BIG network users such as Hughes Aircraft and the far-flung communications arm of Dun & Bradstreet, Dunsnet, rely heavily on their networks as a centralised resource for their decentralised businesses.

"We are large enough to want and need control over our own networks," said Hughes telecomms manager Janey Place.

Dunsnet president Allan Conner said his staff is also sophisticated enough to handle network management, which in Dunsnet's case includes control of T-1 facilities, modems, a packet-switching network and an SNA network.

Conner said he would like to see network control systems improve so they can detect and report on subtler problems than are handled today.

Wandel & Goltermann
Electronic Measurement Technology



Our DA-15 data analyser, tester and simulator eliminates problems. Operates to 72 kbps.

The handy, rapid, battery-powered DA-15 can handle all your data network service problems. It's strong on analysis and simulation, e.g. 64 kbps BERT/BLERT. All common async, sync and HDLC/SDLC procedures. Also has DVM/level meter/ohmmeter facilities plus thresholds and alarm criteria so that it can troubleshoot the analog or a.c. line side of modems. Nonvolatile 64 kbyte memory for programs, data and setups. Menus and softkeys for easy operation. Serial and parallel printer interface. The DA-15 will solve all your service problems. It's indispensible.

Wandel & Goltermann Pty. Ltd., P.O. Box 6202, St. Kilda Road Central, Vic. 3004, Tel. (03) 267 8699, Telex 34 801 WGAUS

I would like:
☐ A free DA-15 brochure
☐ A data test set product guide

Name ....
Company ....
Street ....
Town ....
Telephone no. .... E 7399 KF

Megalink users need top

By David Barker

NETWORK management and control is a top priority as 2Mbit/sec (M2) networks become increasingly important.

Network downtime means revenue loss. In the banking arena, one missed transaction caused by link failure or traffic overloads can result in losses that total millions of dollars.

To prevent such staggering losses and optimise network availability and uptime, effective network management and control systems must be properly planned and implemented.

The focus on network management has been intensified by an increasing demand to transmit information at the M2 rate of 2.048 M-bit/sec.

Confronted with ongoing network expansion and revenue goals, telecommunication managers must explore a variety of M2 services and product offerings if their organisations are to retain a competitive business edge.

According to market studies, banks will rank among the largest users of M2 links by the year 1990.

For that reason, a thorough understanding of the various techniques available to plan, control and manage emerging high-speed M2 networks is a prerequisite to effective communications in the banking industry.

Banks critical

Over the past few years, bank networks have evolved from simple point-to-point M2 links to more complex drop-and-insert and ring configurations.

To support increasing traffic requirements, subnetworks and multinode configurations have been designed to take advantage of newer, software-driven products, higher-quality voice transmission and a full complement of integrated services.

This has increased the need for equipment reliability together with advanced management systems capable of maintaining network availability.

No longer does diagnostic troubleshooting and basic network control suffice. Network management systems now must control an entire network; record and display information; maintain databases of network status, configuration and history; and generate management reports.

They also must help automatically reroute data and dynamically allocate bandwidth to guarantee both maximum network uptime and the best possible performance of the network.

The most frequently stated need for M2 network management systems is central control of the entire network, including nodes, channels and links.

Through proprietary software, sophisticated M2 network management systems provide that capability.

Dedicated processors using mainstream management techniques offer full console configuration management capabilities, which can eliminate the need for personnel at remote sites and allow reconfiguration from the main console.

In addition, they allow local operators to manage certain network functions during the day and return control to the central site at night.

A vital concern in the banking industry is absolute network reliability. Fault tolerance, therefore, must be threaded throughout the entire network, including the management system itself.

This means that the system must delegate management to backup systems at both the main control centre and, in many cases, at regional and district sites.

Furthermore, network reliability requires redundant network components; each node must include at least two data paths for automatic rerouting around a problem area.

Through their ability to dynamically monitor operation of a network, dedicated processors can help an M2 network manager make decisions concerning current problems and forecast future needs. *Dynamic monitoring* checks each component in the network and reports problems back to the management system on real-time basis. This monitoring technique also includes the collection of channel data for billing and statistical data for use in performance studies.

A second type of monitoring, known as *designated monitoring*, allows the network manager to select criteria on specific links or channels for evaluation.

A channel might be monitored, for example, if a user were having a problem performing a certain function. From the central console, the manager sets specific criteria to monitor that user's channel.

Items that can be monitored include security breaches, channel and link statistics, exception events, parameter alarms and modem information.

When this information is sent back to the dedicated processor, selected data is processed as realtime information for immediate display and filled on disk or tape for future processing.

An integral part of the monitoring function, a centralised database contains past and present information pertinent to daily network operation.

The network manager calls upon this database for performance analyses, inventory listings, network and user passwords, trouble ticket files, historical data, billing information, and repair procedures.

Databases have been developed that provide network monitoring with realtime status of all links and nodes. Managers can view color-coded network topology maps to interpret current network status.

They can establish alarm threshold parameters for each configured device in a node, and trace data paths and pinpoint link faults using a configuration view display.

This feature provides color-coded visuals to indicate how traffic has been re-routed when a problem arises.

In addition, performance reports can be generated from the database to simplify the planning process and provide a gauge for measuring vendor reliability.

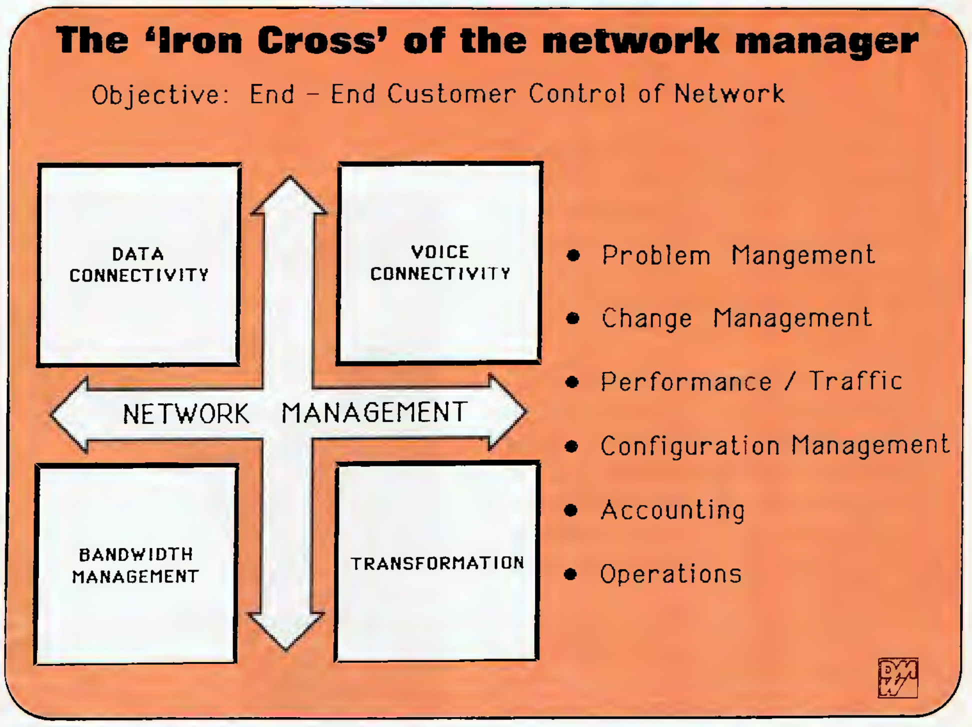
A variety of statistics such as delay times, network errors, realtime events, trending information, and average and peak utilisation of links and channels can aid the network manager in the planning the control of various nodes, channels and equipment in the network.

For example, channel traffic can be balanced using performance statistics that include total characters transmitted and received, percentage of compressed data and the number of viable messages sent or received.

Related statistics can be compiled for device and node traffic characteristics.

Combined, these network management and control techniques provide the telecommunication manager with the necessary tools for troubleshooting current problems and planning for future network expansion.

Because M2 networks carry tremendous amounts of data, the ability to detect and correct problems promptly is an important


The 'Iron Cross' of the network manager

VOX
VOICE OUTPUT EXCHANGE

GONE TO LUNCH!

When Mr. Bell invented the t

FOXY 1287

Human beings. He forgot that they eat lunch. go to the bathroom. attend meetings. visit clients and sometimes even knock off at 5.30. That's why only 25% of first phone calls actually connect. That first connection which could be vital to the ongoing efficiency of your business.

Honeywell VOX takes up where Mr. Bell left off. It turns that sorry 25% or 1 in 4 hit ratio into a slick 100%. using nothing more than the buttons on the telephone. And like the telephone before it. it's totally revolutionising office communications throughout the business world.

Honeywell ensures that even when employees are out of the office they can receive and respond to that vital first call. Instead of the standard "please call back". they get a complete message. up to five minutes long. in the caller's own voice.

Non simultaneous messages can be sent. received.

monitor tools

aspect of M2 network management. Foremost, proper diagnostics help reduce the finger pointing that frequently occurs in multi-vendor networks.

Diagnostics encompass monitoring, trouble-ticket generation and inventory control. Network management systems equipped with adequate diagnostics allow the network manager to test certain portions of the network in response to a macro command.

For ease of use, they provide menus listing all possible commands and their effect on network operation.

The ultimate network management capability is the ability to detect future problems before they occur, which requires isolation of deteriorating conditions as well as catastrophic failures.

For this purpose, M2 network management systems are equipped with monitors that use color to show conditions (green = normal, yellow = deteriorating, red = critical).

Monitor screens are activated by continuous feedback from network components and by numerous tests that are performed automatically or manually. These include endpoint tests that transmit endpoint characters between originating and terminating locations.

For instance, a red channel path reveals a failed test and a green channel path indicates normal operating conditions. Also, control signal profiles are displayed to help managers anticipate problems and avoid service interruptions.

Other forms of diagnostic testing feature pattern generation and verification, round-trip delay, component self-tests, and modem tests, as well as inbound and outbound error monitoring of high-speed M2 links.

Mainstream management systems document detected faults by automatically generating work tickets. These tickets can be logged automatically, and the network management system can save this information when tickets are cleared.

They also can keep track of the inventory of available spare parts. Inventory log items include parts currently in use, components being repaired, spares, and hardware/software revision levels/locations of all components.

Mainstream management systems delegate authority throughout a network. Therefore, they must include safeguards for protecting information; a regional system must not be allowed to alter the configuration of another region or, in some cases, even view that configuration.

The technology needed for M2 network management is available now. To take advantage of this technology, telecommunication managers must incorporate sophisticated network management into overall corporate information planning.

In the long run, properly planned and implemented M2 network management systems such as Infotron's INM (Integrated Network Manager) will optimise network availability and system uptime, simplify the task of performance monitoring, and provide the necessary means of anticipating future growth.

David Barker is a network management specialist with Infotron Systems Pty Ltd.

Packet prices figured

By a special correspondent

WHILE public packet-switching networks offer advantages in connectivity and performance, network designers and managers have great difficulty estimating annual charges for such networks.

The problem lies in the range of variables which need to be taken into consideration before the network can be dimensioned, and the difficulty of tracking the variables involved. Commputer, a low-cost network dimensioning program from Artel, seeks to address this problem.

Typical networks comprise one or more host computer sites with a number of remote terminal locations each with differing numbers of terminals and different traffic loads. There will be a number of different types of transaction, each with characteristic data volumes and holding times.

All this information has to be fed into some modelling system so that the number of logical channels and average busy-hour bit rates can be determined. Once this dimensioning is done, pricing is a comparatively simple process.

The first step in the Commputer approach is to load information about transaction types. In all, 20 transaction types may be loaded. The information required includes the number of screens per transaction (one screen comprises a message pair consisting of a transmission from the terminal and the CPU response), the number of characters per screen to and from the host, and total holding time.

The second level builds terminal profiles in which the user specifies how many of each transaction are handled in a year and to which host they are directed. The program allows for 40 terminal profiles and 26 hosts. The final level creates site data and specifies the number of terminals of each type at each location. There is no limit to the number of sites, which permits dimensioning of quite large networks.

This information is then supplemented with the design grade of service for terminal and host sites and information about the daily busy-hour traffic, after which the program will display for each location the number of logical channels, the average busy-hour bit-rate, and recommend an appropriate line speed and number of lines.

Commputer now offers an Austpac X.25 pricing program as an addon, and additional pricing programs for both Australian and international networks are to be offered in the near future.

The big advantage of this approach is the time it may save. It is now feasible to perform sensitivity analysis in real-time and to determine which components of the packet-switching tariff are costing the most.

The investment checklist

(Continued from page 12)

clude both remote processing sites and unattended network nodes.

Considerable benefits will accrue in the areas of planning and operation from the increasing ability to merge voice, data and image, one of the most significant being the sharing of facilities and the ability to allocate bandwidth dynamically between data and voice facilities as demands change throughout the day. This will place increasing demands on the network's control and reporting facilities.

Brian Fincham is a senior consultant with the DMR Consulting Group.

What will be the pay off? The proper design and operation of a network management system should allow:

- Cost-effective utilisation of increasingly expensive corporate resources
- Positioning the network to deliver a service equal to or better than competitive organisations
- Staff who are occupied with the correct system priorities that support the business needs of the organisaiton

Start as early as possible to manage the network properly, as the rate of change in most networks today will place heavy demands on resources to gain lost ground. Skills can gradually be developed inhouse and you are less likely to suffer from having to rush the development owing to user or competitive pressures.

Senior management must view the network as a strategic resource and be prepared to invest in its development. Identify what it is feasible to achieve today with the resources and technology available.

Plan a phased implementation and set realistic goals. The result will be a network which you understand better and which serves the organisation's needs more closely.

elephone, he forgot one thing...

answered, saved, redirected and even broadcast to others – at the touch of a button. By storing and forwarding messages VOX links your employees, across the country – or worldwide.

And that's just the beginning. There's Voicenet which eliminates long distance telephone tag and overcomes time differences, a Message Desk for outside and customer calls, Call Answering for automatic message taking and much, much more.

No matter how big or how small your business, VOX can be incorporated into any existing telephone system to dramatically increase productivity and significantly reduce costs.

Like Mr. Bell's invention itself, the applications are limitless. It's so simple, so effective, you'll wonder why it's been nearly a hundred years coming.

Call Honeywell today and we'll send you a brochure detailing how the Honeywell VOX can revolutionise your office communications.

Contact: Sydney (02) 690 9352; Melbourne (03) 420 5550; Brisbane (07) 840 6402; Adelaide (08) 274 3201; Perth (09) 362 9558; Canberra (062) 80 5021; Hobart (002) 72 5855; Darwin (089) 47 0477; Auckland, N.Z. 57 5479.

Together, we can find the answers.

Honeywell

Honeywell Limited, 863 Bourke Street, Waterloo, N.S.W. 2017.
TLX: (02) AA20614; FAX: (02) 690 9416.

Broad approach needed in solving

By Steve Cowin

WHY are we only now seeing the emergence of sophisticated Network Management? To answer this question it is necessary to take a brief look at the current networking situation.

The typical company network scenario today consists of a computer surrounded by a layer of communications equipment which is connected to the Telecom network. Network management usually involves a group of specialist network operations staff who know how it all fits together.

In brief, the current principle is to react to user problems with human intervention and physical re-configuration of the network.

Systems sold with networking products to provide remote configuration and reporting are often called "network management" systems. Many computer systems also have so-called "network management" applications. These days a large installation may find itself with four or five incompatible network management systems, one for each of the different products being used. The operators still isolate faults with physical reconfiguration, and still find out about faults from angry users and still only have a vague idea about network efficency. The concept of "network management" suggests something more. One imagines that the network should be managed as an integrated whole.

The problem is that existing network management systems have been directed only towards solving a subset of the overall management problem. Their scope has typically been only the management of some single vendor's products.

What is needed is the general network management solution which is broadly applicable across a wide range of network sizes and applications. This network management system is obviously related to some networking system which itself is general and broadly applicable. Such networks are now taking shape. For these networks the answer to the question "what is a network?" is the entire sum of all interconnected systems.

Standard protocol

There has been major development in networking theory and practice in the past few years which has included the acceptance of international vendor-independent interfaces and protocols.

For network management, these communications standards have been a double-edged sword. On one hand they have allowed equipment manufactured by multiple vendors to be successfully interworked. The standard protocol has provided a basic means of carrying the data which is required for network management. On the other hand, the problem of network management has been made vastly more complex. The once separate networks are now integrated into a single large network, exponentially exploding the number of possible interconnections.

To explain one of the problems that new standards can introduce to the network management problem, let us consider a typical Ethernet local area network. If equipment from three vendors must use the same Ethernet cable you may need *three different* management systems. Often systems cannot access other potentially compatible systems because they have separate managers, and no single management system knows that *both* systems exist. Global management on such a network is required if the standard protocol is to realise its true promise. Once can see that to be fully useful, the network management system must be independent of the equipment it is managing.

We have discussed the twin pillars of network management: fault determination and configuration control. In networks with more than a few tens of terminals, other issues are also difficult and often very expensive to support. Among these are:

- Collection of network traffic statistics
- Accounting or billing
- Computer backup
- Security
- Sharing of bandwidth
- Administrative support of faults and inventory.

The list can be very extensive and varies from network to network. Which of these functions are to be responsibility of the network, the applications software or someone else? Applications are typically developed with little or no consideration of their impact upon networking. The network design is often expected to correct for this. Ultimately — if not logically — it often falls to the network management system.

A basic shift is taking place in the way we think about computer systems. Once the computer was the heart of the system and it had, peripheral to it, a network. Today the network *is* the system. It has embedded in it application servers in the form of host computers. The network management system runs the whole show.

A general purpose network management system can be reduced to a number of subsystems which may operate quite independently. Such a modular system design allows flexibility in the breadth and power of functionality implemented in any real system.

Steve Cowin is a senior consultant with J N Almgren Pty Ltd.

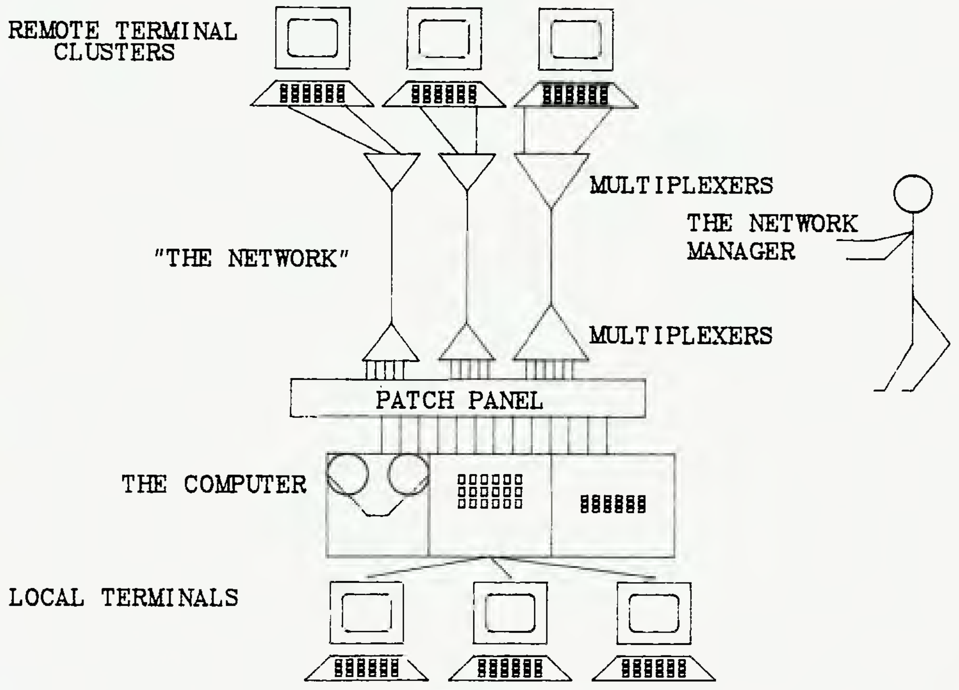
Since the fundamental purpose of a network management system is to give visibility and control of the overall network to the operators, the subsystem which supports the man-machine interface is critically important. It is only in the man-machine interface that the independent subsystems are drawn into an integrated whole.

The importance of the man-machine interface to network management systems can not be overstressed. Many system developers are looking toward 5th generation systems to achieve the power and decision support features required for just this aspect of system design.

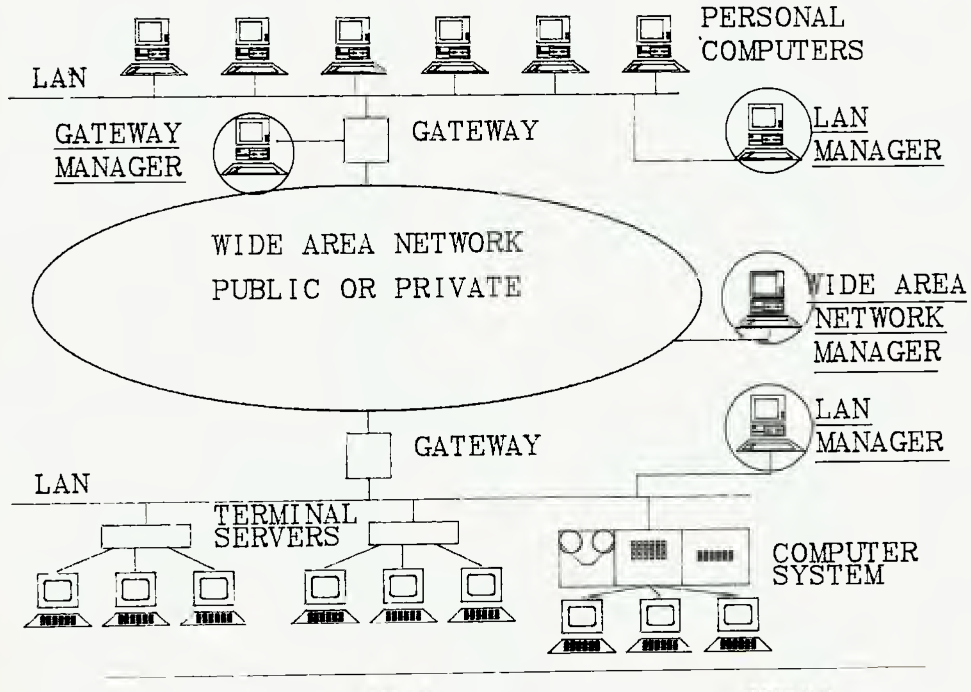
A network management system needs to be itself a powerful communicating system. It must be able to support an extensive range of communication protocols and interfaces. These are used to pass the various management data between itself and the remote networking equipment.

Between the operator interfaces and the network environment, the network management system must logically categorise management functions into related issues. These may be hierachically distinguished as follows:

- equipment hardware function and hardware fault detection



YESTERDAY



TODAY - WHO MANAGES WHAT?

Telecom savings pay

By a special correspondent

AMONG the many tasks facing network managers, one of the most neglected is keeping track of what Telecom is charging you for. Keeping track of costs is a basic business function, but with Telecom's gear being designed by engineers, and not businessmen, effective costing mechanisms are usually an addon and not an integral feature of communications equipment.

There are many products which can assist the telecommunications manager, and they have application in both small and large networks, and apply to both switched and leased lines.

Possibly the most common is Tims (Telephone Information Management System), which in one form or another can be connected to any of the modern PABX's to record usage and log public network calls. Unfortunately, most Tims do not provide the full analysis required for charge determination, and you are advised to spend more to get a system which does give you bottom line detail.

For large PABX networks, the cost of an acceptable Tims is substantial. The problem is that cross-network events are extremely difficult to track, and there is no other way internal cost accounting can be performed to a satisfactory standard.

There are fewer products available to assist in managing leased-line network costs, and the task is made more difficult because the user does not have any means of checking Telecom's distance calculations. Two suppliers with software products which can help are Colwell Computing from Sydney, and Artel Computer from Melbourne.

Both companies produce software products which can be used to determine leased network costs, but have targeted their offerings at different users. The Colwell products have been designed to run on PCs, minicomputers and mainframes, and have advanced features which are of use for the mainframe environment, but add considerably to the cost of the PC versions. Ar-

network problems

- software load and basic operation of network nodes
- network configuration and backbone network topology control
- control of user access network
- end-to-end routing and path control
- network fault detection and isolation (not hardware faults)
- contingency reconfiguration of network
- support and monitoring of end systems (computers/terminals)
- statistics and event gathering and report generation
- administrative support — fault tickets, inventory
- billing and accounting of network usage.

The system should thus be structured according to function and not according to the type of equipment from which the network is constructed. If a network included, say, a packet switch, then each subsystem of the network management system would be individually tailored to the specific characteristics of the packet switch.

It should be noted that different branches of an organisation require different parts of the network management data. For example, the people who are interested in billing generally are not interested in hardware faults. Functional separation, rather than equipment or geographical separation of network management system functions, allows the system to be effectively mapped on to the adminstrative system of which it forms a part.

All-singing, dancing

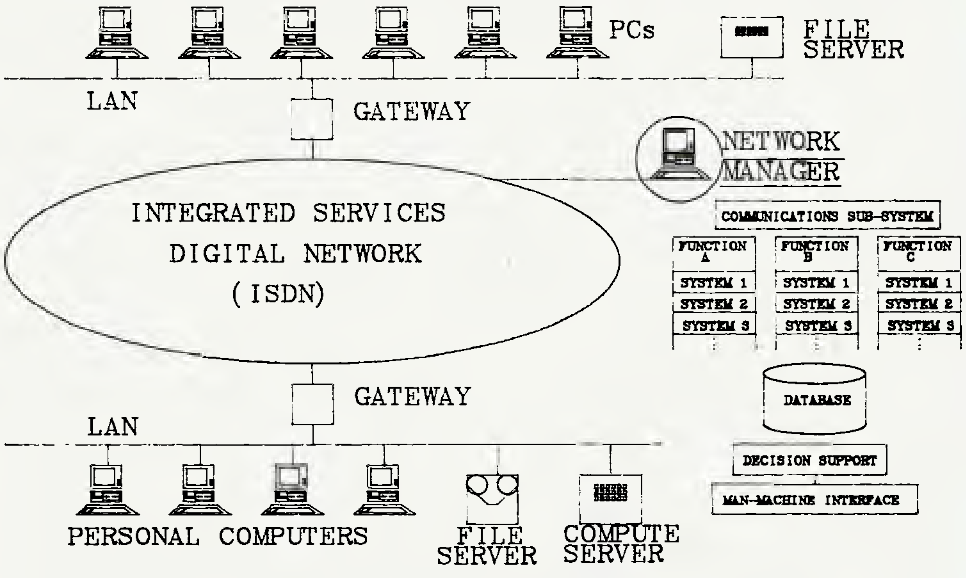
All this seems beyond the realm of the real world. What is the practical structure of such an all-singing, all-dancing network management system?

Luckily the international standard bodies (ISO and CCITT) which brought us the communication protocols which largely precipitated the problem, are now looking at solutions to the problem. Work is currently well advanced on a set of Application Layer Standards known as "Management Information Services".

This work is doing for network management what OSI itself has done for communication protocols. It is providing a conceptual framework, a structural standard and a basis for multivendor co-operation. While the standards strictly apply only to the management of the OSI environment itself and not to such things as hardware, the principles and practices which they embody will obviously be applied to the broader needs of network management.

Personal computers, artifical intelligence and advanced man-machine interface techniques are providing the tools for practically constructing the systems needed.

What is needed above all is awareness, discussion and co-operation among suppliers of equipment, users and network operators. Progress will take place across a broad front which includes a better understanding of needs, a better conceptualisation of solutions, and better tools for implementation. The tasks, and challenges, are as complex and challenging as any in the field of Information Technology.



TOMORROW

for tool

tel's products, on the other hand, are exclusively PC-based products and their pricing is much lower.

In all environments keeping up with the latest Telecom pricing is a real problem. There are still many Telecom staff unaware of the 1986 tariff increases, let alone the new tariffs effective from September, 1987 and you are advised to add tariff maintenance to your checklist before you purchase any pricing product.

You will find that some suppliers do not offer a maintenance service, others do but at a price, while others include a fixed term maintenance agreement in the purchase price.

With the increasing amounts being spent on corporate communications and its increase as a share of total corporate expenditure, there is increasing pressure on network managers to provide bottom-line detail which is not readily available. There are products which can assist and you are advised to check them out. Their cost in most cases will be quickly recovered.

For the ULTIMATE in performance ask about the intelligent versions **COM/4i and COM/8i.** They'll relieve your CPU of the communications processing overhead.

At light speed you can't afford slow comms

When you make the jump to hyperspace you really need to have your multi-user PC or AT performing at top efficiency.

That's why you need a DIGIBOARD 4 or 8 channel communications card. With DIGIBOARD add-on cards there's no resource sharing (like many other cards), each channel has its own separate UART and support chips. They are faster and more efficient than any other boards around. That means you get better systems response, especially in multi-user comms environments.

And if you're using the new 80386 processor based machines, DIGIBOARD cards will keep up with them at the full 12.5MHz.

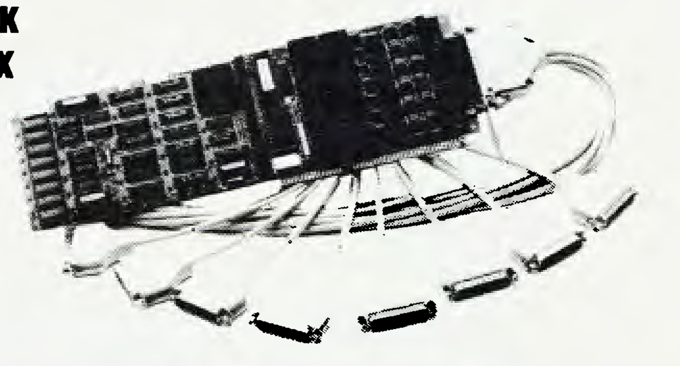
So, if you want real performance from your multi-user or other comms oriented system, call us today about DIGIBOARD.

After all, you wouldn't want to crash into a star because of low comms system response would you?

DIGIBOARD COM/4 and COM/8 are compatible with the following multi-user operating systems and come complete with all the necessary device drivers:

VENIX System V (UNIX System V)
System V/AT (UNIX System V)
SUPERDOS
SCO XENIX/V
THEOS
PICK
QNX

DigiBoard
Plugging you into Tomorrow



COMPUTER & PERIPHERAL SALES PTY. LTD.

Unit 2/18 Salisbury Road Asquith N.S.W. 2078
Phone: **(02)476 6400** Telex: AA176188 CANDPS Fax: (02)477 7565

OEMs whistle up The Sniffer

By Mary Petrosky

SUNNYVALE, California — Never mind that the name of its product conjures up images of a bloodhound with a bad cold. Start up Network General Corp now celebrating its first anniversary, is boasting a customer list that reads like a who's who of the computer networking industry.

IBM, Digital Equipment Corp, and Wang Laboratories, are among the computer vendors using Network General's local network protocol analyser, The Sniffer. Introduced last September, The Sniffer has also attracted the attention of vendors of personal computer networking and 3270-type products, said Harry Saal, president and founder of Network General.

Users of The Sniffer include Proteon, Sytek, 3Com, Digital Communications Associates, Micom-Interlan, and NCR Comten. In addition, corporations that have large personal computer nets, such as United Airlines, Baxter Travenol Laboratories, and Travellers Insurance, are also using The Sniffer, noted Saal. "These are companies that are designing their own network-based applications used in selling their products or delivering services," said Saal.

Network General sells The Sniffer primarily to developers, as opposed to endusers.

Saal founded Network General last June with his colleague of many years, Len Shustek. Both men were also founders of Nestar Systems, a local area networking company. The founders have kept the company small. Manufacturing and assembly, along with some software development, is done by outside vendors, said Saal.

Although he noted that the company is already profitable, Saal refused to release any financial information. Network General is a private company and is not required to release its revenue figures.

A network analysis and diagnostic tool, The Sniffer is capable of capturing all, or a subset of, the packets of data transmitted across a local-area network.

It can monitor real-time system performance and can be configured to watch for specific events, such as monitoring for a particular type of error or tracking traffic between two nodes.

One key use is in the development and debugging of network protocols, hardware and software, said Saal.

The Sniffer was introduced for analysis of the IBM Token-Ring Network, but Network General's strategy is to support a wide array of network types, said Saal.

In March, the company announced support for Ethernet, followed in May by a joint agreement with Datapoint to develop a version of The Sniffer for Arcnet.

Although no formal announcement has been made, the company also plans to support Starlan.

In addition to supporting the standard IBM protocol suite, including Network Basic I/O System, LU 6.2 and the Server-Message Block, Network General also supports protocol suites used by Novell, and 3Com.

Packaged unit

The Department of Defence Transmission Control Protocol/Internet Protocol (TCP/IP) and related protocols, Network File System (NFS) from Sun Microsystems and mid-level OSI protocols are also supported.

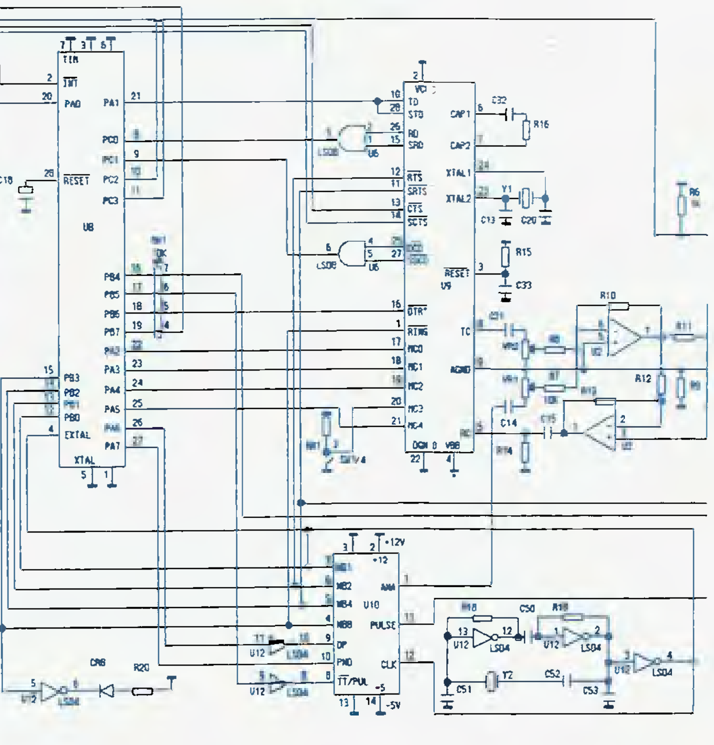
Pricing for The Sniffer ranges from $US19,000 to $US29,000, depending on the protocols supported by the systems configuration.

Network General's key competitors are Hewlett-Packard and Excelan. However, both HP's and Excelan's Lanalyser EX 5000E analysers are designed to work only with Ethernet networks. HP's system is offered as a package unit priced at about $US27,500. Excelan offers a packaged unit, based on a Compaq Portable 286 computer, for $US19,000, as well as a $US9,500 boardlevel version that can be installed in an IBM Personal Computer XT, AT or compatible.

"The Sniffer is part of a huge business called network management," said Saal. "We're aware of the fact that we're only tackling a part of the problem. The Sniffer is for a very specific kind of a problem — taking a look at a local-area network, not a wide-area network."

Determining if there is a problem and what to do about it is up to the technician, noted Saal. "I think that's one of the disappointments for some people. They're looking for something totally automatic that's going to tell them that their network is broken, and maybe even tell them what to fix," he said. "If we knew how to do that, we'd be shipping those products today."

Analysts see the biggest market for the The Sniffer as the enduser market. "The local-area network vendors have built network monitoring products of their own, but none of them are as rich in capabilities as The Sniffer," said one of them. "Right now, the product is a development tool. It will need to be repackaged to be sold into the enduser market — but that's the easy part."



THE CIA WOULD LOVE TO GET THEIR HANDS ON THESE.

If the CIA was in the market for new modems we don't believe they could go past NetComm's new DataLock® models.

We don't believe they could get past DataLock either. Because they're designed to put a security lock on vital information.

DataLock modems are secure. Passwords check the credentials of incoming callers to make sure you know who is accessing your data. Two levels of protection, using the powerful Data Encryption Standard, secure valuable data from interception in the telephone system.

Error protection protocols built into DataLock modems ensure your data gets to the other end without corruption, so you don't need special software protocols on your computer.

DataLock modems not only include the "AT" command set and variable speed, auto ranging capabilities of NetComm's SmartModems but also add a constant speed interface to your computer. DataLock modems can access low speed 300 bps services, Videotex services such as VIATEL at 1200/75 bps as well as a wide range of mainframes, networks and bulletin boards at 1200 and 2400 bps.

We have to admit, even the CIA will be impressed with the new DataLock modems.

But, unlike the CIA, you won't need an unlimited budget to get your hands on them.

NetComm
Total Solutions to Data Communications

NetComm (Aust) Pty Ltd • NSW PO Box 284 Pymble NSW 2073
Tel: (02) 888 5533 Telex: AA27488MODEMS Minerva: 07DNC002 Viatel: 288855330
VICTORIA 94 River Street South Yarra 3141 Tel: (03) 241 0534
QUEENSLAND Suite 6 Level 11 AMP Place 10 Eagle Street Brisbane Tel: (07) 229 7376
WESTERN AUSTRALIA St Martins Tower 44 St Georges Terrace Perth 6000 Tel: (09) 220 3407
®DataLock is a registered trademark of NetComm (Aust) Pty Ltd and is designed and manufactured in Australia

NE60 FPC

Getting rid of telephone tag

By John Hunter

THE voice mail market in Australia has matured during the past year, with pioneers AAP-Reuters having placed more than a dozen Aspen systems — several of them upgrades or second installations — and IBM claiming an undisclosed number of sites for its Rolm Phonemail product. Honeywell has also come to market with the original VMX product in several configurations, and has sold a system to ICL in Melbourne.

A sure sign of recognition is the fact that even Telecom and OTC are beginning to look at the voice messaging potential, which has seen a number of store-and-forward bureau services spring up so far in capital cities.

And, according to AAP-Reuters southern region manager, David Blanks, a bank is testing a demonstrating voice mail service for customers which gives direct access to a transaction-processing database. This, he said, takes Octel's Aspen system "one stage past the third-generation".

In the article which follows, consultant John Hunter pits Octel's Aspen Maxum against the top-of-the-range product from heavyweight VMX, the 500 series and concludes that they are pretty evenly matched.

USERS looking for a way to eliminate telephone tag, missed calls and garbled messages should investigate voice-messaging systems. While these are not perfect, they are definitely superior to the pad-and-pencil approach.

Voice-messaging products conjure up many different images. Some users think of them as telephone answering machines; others view them as voice bulletin boards. But most voice-messaging products go beyond those services and establish individual and system mail-boxes where callers can deposit and receive messages. They also distribute messages to users on the same network or on different networks.

The more sophisticated voice-messaging systems also let users establish distribution lists for broadcasting messages to groups of users.

Two sophisticated voice-messaging systems that incorporate these features are the Aspen Maxum from Octel Communications and the 5000 Series from VMX Inc. Both products integrate with a variety of PABXs and both support message-waiting indicators and call forwarding. The two systems also let users send personalised greetings to callers who reach a busy or unattended phone and let the caller access the mailbox or talk to the operator.

The Octel and VMX units can place calls to off-site locations through an out-calling facility. This permits mailbox holders to have calls sent to temporary or permanent outside telephone numbers, such as home phones, and is ideal for telecommuters or other employees working away from the office. The caller can even mark urgent messages for immediate delivery. (Octel is about to release a directional interface — *Ed.*)

Two voice-messaging systems compared

	Vendor/Product	
	Octel Communications Corp **Milpitas, Calif./** **Aspen Maxum**	**VMX, Inc.** **Dallas/** **5000 Series**
Number of ports	4 to 72	4 to 64
Storage hours	6 to 304	13 to 526

Like all voice-messaging systems, the Octel and VMX units operate behind the PABX interfacing with the switching system's trunks and lines. The analogue voice inputs are digitised via a coder/decoder and the quantised voice is stored on disk. The 5000 Series digitises voice at 16K bits/sec, while the Maxum digitises it at 25K bits/sec.

Message-storing capacity, which is usually expressed in hours, is a key feature of voice-messaging systems because it ultimately determines their capability. To conserve space, the Octel and VMX units store data in compressed mode, which means that they do not record silent periods in a message. Both companies offer field-installable disk packs to increase capacity. However, the storage techniques these systems use differ greatly.

The Maxum uses a proprietary scheme in which storage space for digitalised voice is dynamically allocated as needed. Octel calls this "sectorless storage." The company says that no disk space is wasted because the system uses only the amount of storage space needed to hold each message. By contrast, sectored disk techniques allocate storage space in blocks. Since any unused portion of a sector cannot be allocated to another message, this technique wastes space if a message takes up only a small portion of one sector.

The VMX 5000 Series, however, uses 10-second wide "sectors" called voice-block sections. Using this method, the most space that could be wasted per message is nine seconds, according to VMX.

Both the Octel and VMX units are easy to use. Callers access the systems through push-button telephones, using the telephone's Dual Tone multi-frequency signalling to activate system options and enter passwords.

The 5000 Series and Aspen units provide prompts that can be used by inexperienced callers; those more familiar with system operations can skip ahead by entering the appropriate codes.

In both units, the automated attendant answers, states the options and prompts the user to press the appropriate key for the desired service. Callers can then enter the extension or voice mailbox number, if known. With the Maxum, they can also enter the called party's last name to receive a list of mailbox holder candidates.

If callers do not know the extension, they can enter the called party's last name. The caller then receives a list of employees with similar names. Prompted by the system, the caller then enters a digit for the desired box holder. If the PABX permits, callers can connect directly to the mailbox if the called party is unavailable. VMX says that it is working on a directory that allows callers to enter the last name of a called party.

Both systems group messages for remote node delivery to eliminate the time-consuming process associated with node communications initialisation. They also schedule deliveries, when possible, to coincide with the most favorable telephone rates. However, messages marked as urgent are delivered immediately.

The Octel and VMX systems transmit messages via analogue telephone lines. Depending on message volume, this can be a drawback, as each second of recording involves 16K- or 25K-bits of disk storage. VMX offers a facility called Turbo Voicenet that achieves a 30 per cent reduction in transmission time by shortening the handshaking protocol and transmitting data in compressed format.

The Octel and VMX systems also support message-distribution lists. A distribution list simplifies the process of writing messages by grouping target mailbox numbers. After recording a message, the sender enters the mailbox numbers on to a distribution list, using a telephone keypad. After that, the user simply enters the distribution list number, and the system does the rest.

The Octel unit allows each mailbox holder to have up to 25 mailbox distribution lists. Each list can contain an unlimited number of mailbox numbers. The VMX unit puts no limits on the number of distribution lists or on how many mailbox numbers are in each list.

In addition to allowing message distribution within a node, both systems permit networking among their own nodes. Neither will communicate with voice-messaging systems from other vendors but they are compatible with other proprietary messaging systems.

The Octel and VMX systems provide several flexible schemes for networking. For example, the network manager could use a unique numerical designator code for each node and mailbox, or it could use something as simple as the area code where the node is located. The last three or four digits of the recipient's telephone extension could be the mailbox address. Both products allow an unlimited number of nodes to be configured.

Unlike the Octel unit, the VMX 5000 Series is among the select group of voice-messaging systems that interface with E-mail services. (Others include Rolm Voicemail and Zymacom.) It is compatible with Digital Equipment Corp's Vax/Mail and All-In-1 and IBM's Professional Office System.) Octel is working integration with these and Data General's CEO package. But delivery is still up to 12 months away. — *Ed.*)

But while most integrated systems are limited to notifying users that voice or E-mail messages are waiting, the 5000 Series is one of only two systems (Zymacom's Information Exchange is the other) that can convert text messages to voice. Voice-to-text conversion is currently unavailable from any vendor.

● *John Hunter, president of consulting company TMS Corp, is a contributing editor to* Network World, *our US sister publication.*

Looking for a genuine 3rd generation voice messaging system?

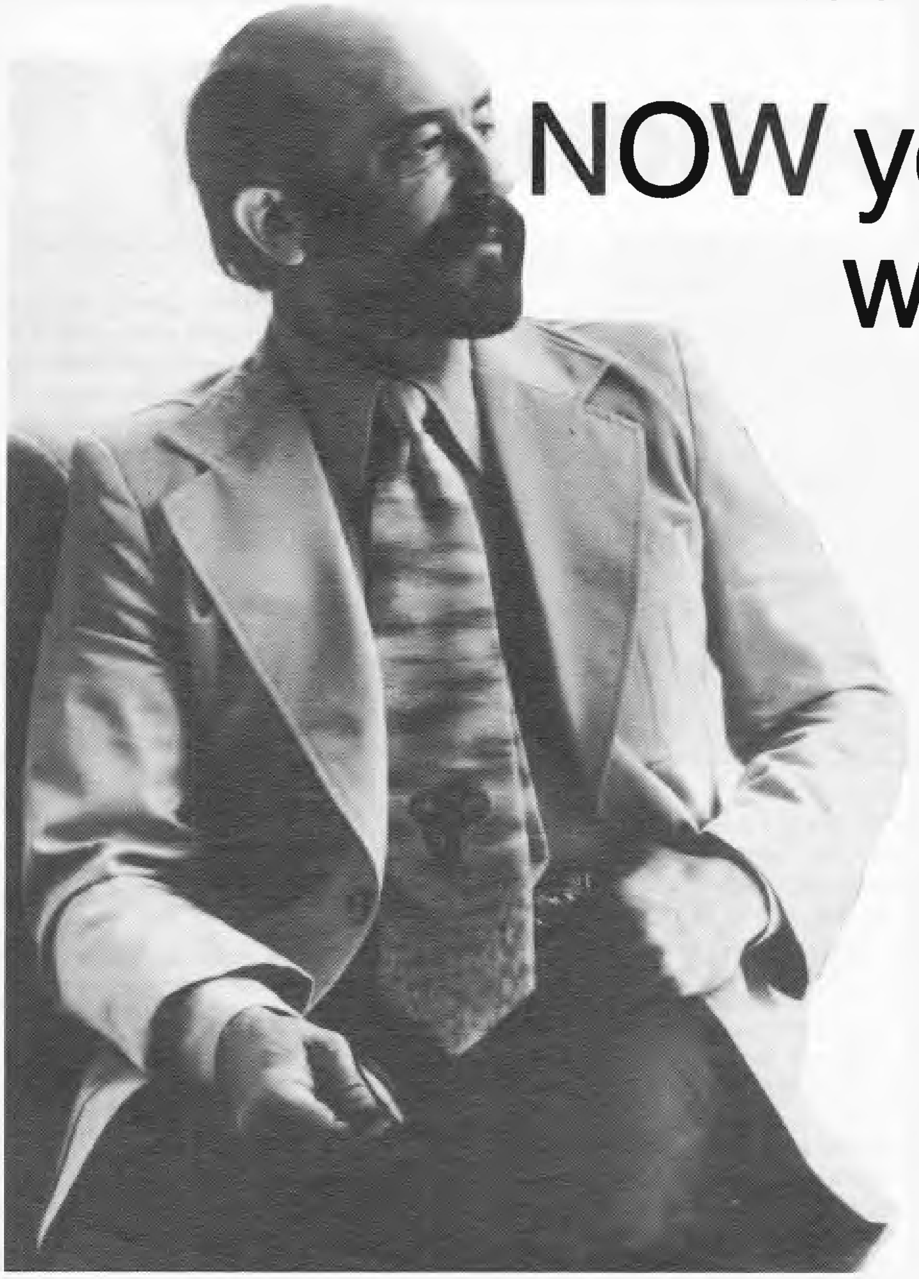
Aspen®

is the only voice messaging system that works with all PABXs on the Australian market

- with a messaging service that does away with telephone tag once and for all.
- that offers the most advanced and user friendly VOICE MAIL system in the world today — delivering your voice mail from anywhere in the world.
- that is the leading system in Australia and the USA. Aspen is in use by over 350 corporations in the USA.
- that gives you the best price/performance of any system on the market today (some of our clients say that Aspen has paid for itself in less than 6 months).
- that is the only voice messaging system in Australia with a wide range of options. From a few mailboxes on our Bureau — to term rental of the system — to outright purchase.
- that is fully supported in Australia and New Zealand by AAP Reuters Communications.
- that is the only system in use by voice mail service bureaux in Australia.

To find out how AAP Reuters can provide your organisation with this new competitive edge call:
John Glassford in Sydney (02) 692 1119
Frank Wheatland in Melbourne (03) 619 9314
Richard Lawrence in NZ (64 4) 73 8120 ext 845

AAP REUTERS COMMUNICATIONS PTY. LTD.
The professionals in voice messaging



NOW you know what to do with yesterday's PC

More than a year ago, when AAP-Reuters launched Octel's innovative Aspen voice mail system on the local market, visiting US voice mail consultant Donald Van Doren admitted that yes, there might be something to the scattered startups experimenting with voice mail on a PC. Today, such boards are offered in the latest Byte magazine for perhaps $US365. Charles Lecht, who operates from his Tokyo thinktank, surveys the development.

ALTHOUGH the role of a computer as a voice and call processing system is not very new, its use as such by personal computer owners did not get started until the early 1980s. Only recently have such systems become very useful.

This is because the limitations of past systems have been overcome by the appearance of ever greater memories in PCs (voice uses far more memory than text), faster processors, better PC communications facilities, and sophisticated software to handle voice data compression/expansion (storage/retrieval).

Recently I witnessed a demonstration of one such system installed in the offices of a high-tech wizard in Shinjuku, Tokyo's ultra-modern financial centre. It was really the first time that I paused to consider this technology, and I was impressed by what I had seen, or heard.

My host was quick to mention that his PC housed a board that transformed it into a complete message processing centre, that the board was far cheaper than half a month's salary for a secretary, and that anyone could instal it.

Once installed — a process that requires doing some (but not too much) thinking as to how you intend to use the system, opening the chassis of a PC to slip the board into a vacant slot, and running some software — you are ready to obtain its benefits, which my host held to be valuable indeed. After his demo, I could only agree.

For years now I have been messing around with telephone answering services and machines and/or the services offered by our telephone exchange folks, and all have proven to be unsatisfactory for my needs. Either the fuss of dealing with answering machine tapes, the unreliability of the systems, or the inconvenience they make for callers (wait for the beep) made me discard one after another.

So when my friend invited me to see and hear his system in operation, I accepted his offer. Although it was taking place in Japan, the demo involved a technology made in the US, by two companies: Applied Voice Technology responsible for the software and Dialogic Corp, which made the hardware.

The product these companies combined to make manages four independent telephone lines connected through standard RJ11 or RJ14 jacks. The version I saw was hosted on an IBM PC AT with a 20M-byte hard disk.

If you think of the most sophisticated PC-based networked store-and-forward system for text data, you can start to appreciate the kind of facilities available on a PC-based voice and call processing system. Of course, the big difference between these systems is found in the communications medium used — voice v text. Everything else is basically the same.

Messages are sent and received at the convenience of those involved, and both systems help overcome international time differences in their issuance/receipt. They are amazingly accurate and efficient, and both allow users to express their personalities through personalised message "envelopes".

Both offer reminder facilities and some even offer alarms. Also both sport full message editing, delivery confirmation, annotation, broadcast to multiple recipients, and security encoding capabilities.

As you might expect, each of these mediums has its advantages and disadvantages. But if used properly, together they offer the broad coverage of a postal service and telephone exchange. However they overlap, they augment each other rather than they compete.

Interestingly, the voice and call processing system and text communications systems available for today's PCs are sophisticated enough to serve a wide class of users with both national and international communications needs — this without their having to subscribe to any service other than that offered by the local telephone company.

> *'The quality and quantity of voice messages that can be handled by today's PC are excellent, which should not surprise us'*

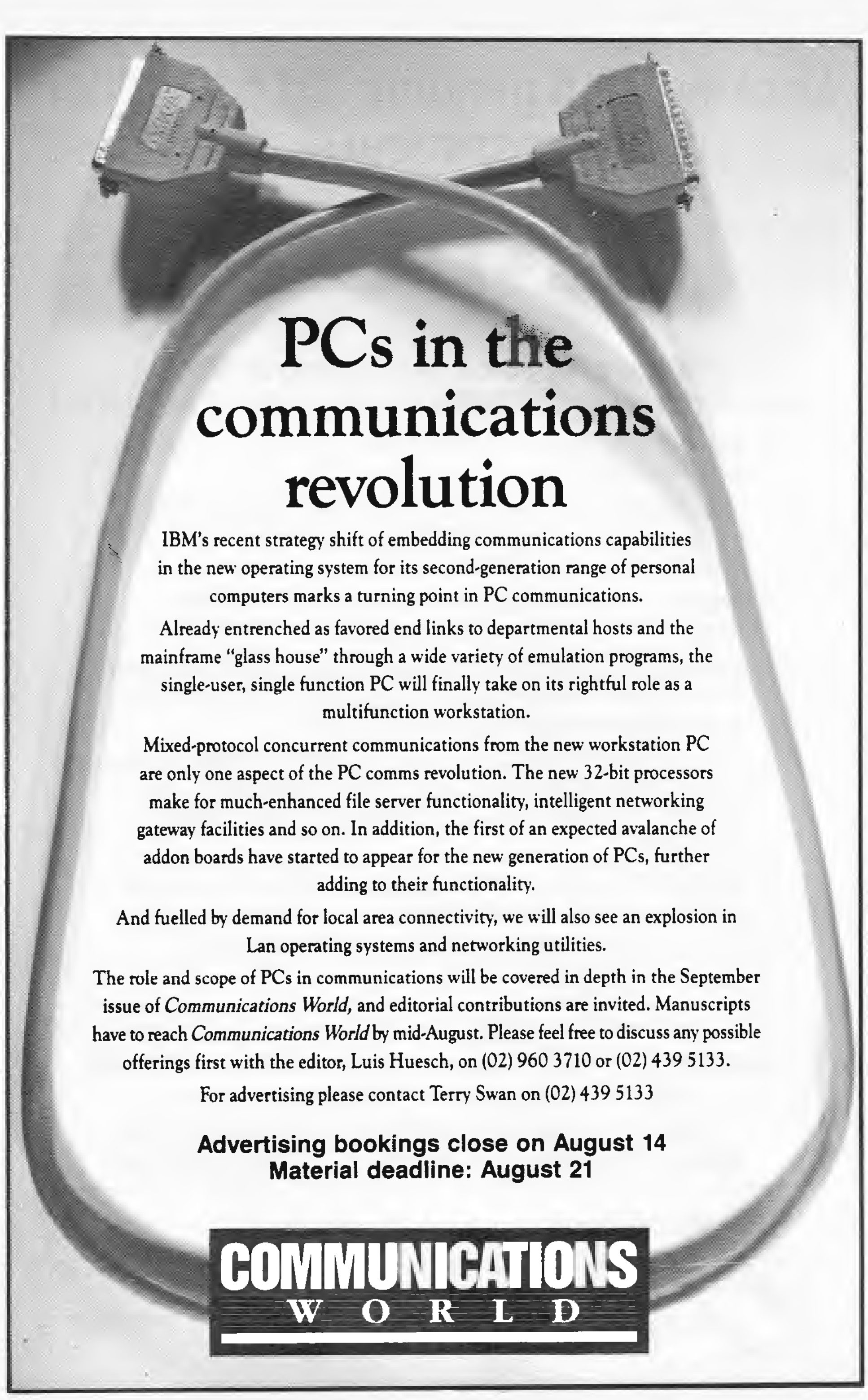
I suspect many users are constantly deluged with mail exhorting them to subscribe to this service or that one because of vast databases or because they allow multiple mailings of the same message, and so on.

So far, I have found essentially nothing that any of these services offer that I cannot do on my own or acquire on an ad-hoc basis without subscribing to anything. I admit this may not be the case for others, who must do instant research.

The quality and quantity of voice messages that can be handled by today's PC are excellent, which should not surprise us. It is yesterday's (or was it the day before's?) mainframe. And the cost savings in communications that may be achieved can pay for the installation of the system in no time flat.

Users would do well to investigate voice and call processing system alternatives, and get on with installing the technology. Were you wondering what to do with yesterday's PC?

All we are missing today is a language translation module to overcome the incredible linguistic difficulties that are still with us. Then we will have it made!



PCs in the communications revolution

IBM's recent strategy shift of embedding communications capabilities in the new operating system for its second-generation range of personal computers marks a turning point in PC communications.

Already entrenched as favored end links to departmental hosts and the mainframe "glass house" through a wide variety of emulation programs, the single-user, single function PC will finally take on its rightful role as a multifunction workstation.

Mixed-protocol concurrent communications from the new workstation PC are only one aspect of the PC comms revolution. The new 32-bit processors make for much-enhanced file server functionality, intelligent networking gateway facilities and so on. In addition, the first of an expected avalanche of addon boards have started to appear for the new generation of PCs, further adding to their functionality.

And fuelled by demand for local area connectivity, we will also see an explosion in Lan operating systems and networking utilities.

The role and scope of PCs in communications will be covered in depth in the September issue of *Communications World,* and editorial contributions are invited. Manuscripts have to reach *Communications World* by mid-August. Please feel free to discuss any possible offerings first with the editor, Luis Huesch, on (02) 960 3710 or (02) 439 5133.

For advertising please contact Terry Swan on (02) 439 5133

Advertising bookings close on August 14
Material deadline: August 21

COMMUNICATIONS WORLD

Overseas Outlook

AS PART of its strategic direction of offering a complete communications product line, Digital Communications Associates (DCA) will acquire local-area network company Fox Research, a subsidiary of Fox Technology, for $US10 million in cash and debt assumption. The two companies expected to close the acquisition in mid-August.

MICOM Systems plans to acquire Spectrum Digital Corp, a T1 multiplexer vendor, for a total of $US25 million in cash and stock.

IN A MOVE designed to help sell its telecommunications wares in Europe, IBM recently announced the creation of a unit to develop and manufacture voice- and data-switching systems adapted to the European market. Called Integrated Services Switching Systems (ISSS), the organisation will be based in England at IBM's Havant facility, and will be headed by Frank Onians, a vice-president of IBM-owned Rolm Corp.

NIPPON Telegraph and Telephone (NTT) and Sony have announced plans to jointly market a video phone system that can transmit and receive still pictures over existing phone lines. The system, consisting of a high-sensitivity camera and a 4in black-and-white flat monitor, is designed to be connected without modification to a telephone set using a modular plug. The system can also be connected to a video printer, television, video tape recorder, or ordinary tape recorder. Images take nine or 10 seconds to transmit. In Japan, NTT will sell its version to businessess for $US343 and Sony will market its system to home users beginning in September.

OLIVETTI has scooped a $A9 million deal with the Britannia Building Society, a UK savings and loan association, to supply workstations to the society's 250 branches. The Italian company, which already had a contract to service Britannia's Ericsson equipment, won the order against competition from Philips and Nixdorf. The workstations will be based on Olivetti multitasking machines running on 80286 and 80386 multiprocessors.

UK-BASED Thorn-EMI subsidiary Software Sciences has won a $A22 million contract to computerise the British passports system against competition from the favorite, Electronic Data Systems of the US. Software Sciences has also been asked to put together a consortium to tender for the $A220 million program to computerise the UK Post Office counter services. The passports program is to streamline the issuing of computer-readable passports to European community standards in no more than five working days from next year.

EUROPE is trying to get its five incompatible cellular radio telephone systems talking across national borders with the recent decision by community ministers to develop a pan-European mobiles system by the end of the decade. The program is in part an attempt to prevent European manufacturers from getting carved up by US and Japanese rivals.

FAULT-tolerant processor maker Stratus Computer has teamed up with workstation experts Sun Microsystems to integrate and market network systems based on Stratus servers and Sun workstations. As a first step in the venture, Stratus has licensed Sun's Network File System (NFS) and will jointly develop an interface to the Stratus engine with Sun. Meanwhile the Corporation for Open Systems (COS) has selected Sun as primary supplier of workstations for OSI conformance testing by its 60-plus member companies.

Export nettle must be grasped

By Luis Huesch

AUSTRALIAN high-tech entrepreneurs must learn to see the world as their oyster, both as a market and as a source of venture capital, according to Netlink chief executive Paul Wood.

If they are serious about wanting to export, they must make a whole-hearted and well-planned longterm commitment to the market of their choice, Wood told industry colleagues at the *Computerworld* Comnet communications seminar in Sydney recently.

Wood also claimed that government funds intended to help high-tech export drives were largely wasted.

Australian companies often had better technical skills than many of their US competitors, but had failed to capitalise on this through a lack of marketing skills.

Scitec, for instance, had developed a pioneering T1 multiplexer but had lost its early chance of capturing the US market when it licensed the product to Digital Communications Associates in return for small royalty payments, said Wood. The distributor later bought a local US startup company and got itself a new product and a stronger market position.

A Sydney company built a trail-blazing ultrasound diagnostic application but failed to bring home the bacon because it:

- sold in the US through a large corporation (GE),
- depended on that distributor yet did not have the right relationship,
- was not itself close enough to the market and failed to sense its needs for a range of sizes for the equipment,
- did not generate enough revenue and
- did not have enough vision.

Eventually, General Electric built its own version of the device pioneered by the Australian company.

Wood, who said modestly that he has put Netlink/Systech "on the road to success" with its specialised products for the SNA market, has just finished a round of venture financing to raise $US8.3 million and is about to attack the highly concentrated and potentially lucrative West German market with a new communications product.

He gave his lucid presentation of the preconditions for successful overseas marketing on the second day of the two-day meeting, after briefing attendees on SNA perspectives. A video of Wood's talk is available and should be required study material for any local CEO aspiring to export successes.

Wood pointed to the example of high-growth startups in the US communications field which largely owed their present stature to their marketing success.

Noting that the definition of "successful" cut in at perhaps $US30 million and adding that Netlink was "getting there", Wood cited:

- Network Equipment Technologies (NET) which had soared from $US2 million to $US47 million by concentrating on becoming the dominant supplier of large T1 multiplexers;
- 3Com, which had gone from $US3 million to $US100 million in 4½ years by changing its perception in the market to that of a vendor of "workgroup computing" equipment;

■ ***Paul Wood . . . Australians are losing markets through not capitalising on technical skills.***

- Novell, which had focused on a market need and telling the market about it;
- DCA, a "marketing and acquisition success";
- AST Research, which in three years had raced from $US11 million to $US172 million by positioning itself as a vendor of system solutions, PCs and desktop publishing;
- Lee Data, which had capitalised on its database engines;
- Network Systems, which was growing 50 per cent a year, based mainly on its successful Hyerchannel product, and
- Concord Data Systems, which had been the first to catch on to the CCITT modem standards and gained a competitive advantage over other US modem vendors.

> *'Think globally for markets and money'*

Wood said there were internationally recognised Australian companies such as TNT, L J Hooker, News Ltd, Industrial Equity, Bell Resources, Elders IXL, Bond Corp and IPEC, but each had made a strong commitment to the market it operated in, and in several cases cases the chief executive lived in that market.

Similarly, Nixdorf had made strong inroads into IBM's own market with retail terminals in the US, and even though US revenues were but a small part of Nixdorf's overall income, CEO Klaus Luft had chosen to move to Boston and Nixdorf board meetings were now held in the US.

Australian entrepreneurs should also realise that "capital is a global resource and readily available," he argued. As prerequisites for raising capital, companies should have an:

- excellent management team
- growing market
- unique product/positioning
- opportunity to build a large market.

If a company scored eight out of 10 for each, it would find lots of venture capital ready to back it up.

If not all pre-conditions were met, it would be more difficult and take longer to raise venture capital, but it could still be done, said Wood.

The main thing was to think globally, he said, noting that even in the US over half of the venture capital came from non-US citizens. In Netlink's case, all but one of its eight or nine venture funds were US-based, but the money came from Swiss telecommunications companies, rich Singapore businessmen, the Korean government, and so on.

Wood slated local hi-tech entrepreneurs for expecting — and getting — too much help from the Australian government. This led them to make brief cursory exporting forays, dropping in somewhere to appoint a distributor, and flying home again believing that was all there was to it.

Instead, companies must make a properly planned and financed commitment to foreign markets.

Wood defended local venture capitalists against criticism that they did not easily make funds available by saying "they have not seen many success stories".

Major barriers to export success included lack of capital ("even though venture capital is available for good ideas"), lack of market understanding ("a significant failure is lack of experience") and a lack of management depth, said Wood.

Why should Australian companies bother about the world market? Well, for one thing, "all well-financed international companies bother about us, and create strong local competition".

And Australian companies needed the larger international market to lower their unit costs, he said.

Unless there is local protection through tariffs or Telecom, Australian companies will fail if they make products for the local market only, said Wood.

Protection also carried extra costs to the community, said Wood, who criticised AWA, which had a lot of resources but "spends its time on defence contracts".

COMDEX®

19-21 August 1987
RAS Showgrounds
Sydney

NOW ONLY DAYS AWAY
PLAN NOW TO BE THERE!

with a conference program packed with the latest information and many user case studies, many conference sessions are sure to be

"STANDING ROOM ONLY"

with over 70 companies exhibiting (many from overseas with exciting new products) be sure to plan your time carefully!

REMEMBER YOU CAN CALL SYDNEY OR MELBOURNE '11625' FOR RECORDED INFORMATION ON THE CONFERENCE PROGRAM ... AND IT'S UPDATED EVERY FEW DAYS

COMDEX® — the computer and communications exhibition and conference for professionals

EXHIBITION ENTRY

— $15 or by exhibitor invitation

CONFERENCE FEES

— any one day $130
all 3 days $240

COMDEX
is presented by
T.I.G. AUSTRALIA INC.
Level 9, 8 West Street,
North Sydney 2060
Phone: (02) 959 5555

PHONE TODAY FOR FURTHER INFORMATION

StreetTalk explained

LOCAL area networks have management problems of their own, and vendors tailor specific solutions to let administrators handle them.

One of the more interesting approaches in this field is that taken by Banyan Systems, which sells servers and the networking operating software, Vines (Virtual Networking System).

The company detailed its Streettalk net administration software and related software infilities and hardware diagnostics recently.

Streettalk is "a distributed naming system with true location independence," according to Dean Polnerow, director of software engineering for Banyan.

Names and locations of resources, such as file, print and communications servers, along with user names and group indentities, are maintained by Streettalk.

Each server maintains its own subset of the entire network database. When a server is brought on to the Lan, it first broadcasts its resource database to other servers.

This means that all servers connected on a Vines network know where the others are located, since information on location is maintained automatically by the servers, rather than manually by a network administrator.

Therefore, network administrators can manage network resources "without leaving their seat or even knowing the network topology," said Polnerow.

"Anyone with the proper security clearance can obtain information (on these resources) by using any workstation on the network."

Another utility included with Banyan's operating system is the Report program. This provides a user profile of the Streettalk database, sorted by server, group and organisation.

Since Streettalk is a distributed database, user names potentially could be stored on all servers on the Lan. "Ideally, the administrator should have a user's files and his Streettalk profile on the same server," said Dave Straube, manager of system engineers for Banyan.

Banyan's network-administration tools go beyond Streettalk's keeping track of names and locations, however. The company also includes hardware diagnostic tools for a variety of supported Lan adapters, including Ethernet and Token-Ring cards.

Diagnostics

Banyan's network diagnostics are the most powerful ones available for Lans, according to several users who evaluated different Lan operating systems.

The diagnostics can test for failures at the Lan adapter card, cable, wiring closet or server, giving network administrators help in quickly identifying and fixing circuit problems.

Banyan's network-diagnostic software includes five tests: one that tests the card-network interface; another that tests the direct memory access; two loopback tests (where trial data packets are sent and received around the network); and a special echo test where trial packets are sent to the nearest server and returned. The latter test verifies whether the server is working properly.

"The first step isn't to solve your network problem," said Straube, "but to make it reproduceable. If you can't reproduce the problem, you'll never be able to solve it.

"The diagnostics can be really informtive, since a token running through a Token-Ring Network with lots of active nodes can go 18 miles around Manhattan."

One way to assist with hardware diagnosis is to put the diagnostic files on each workstation boot disk, he said.

"This way, when the network goes down, you have the tools right at hand."

Another set of software included with the Banyan operating system is the Netman utilities. These utilities display load and input/output (I/O) statistics for each server on the network, and can be run from any workstation.

> *'Manage resources without leaving your desk'*

Netman is completely menu-driven. Each menu displays a variety of statistics which, properly interpreted, can quickly identify problem areas such as poorly functioning Lan adapter cards, overloaded servers and crowded server Ram configurations.

Netman can be used to test for appropriate network topology, for example. If one server is receiving too many data packets destined for others, it may be time to re-cable the server to other workstations, according to Straube.

Alternatively, if one server (or one disk on a server with multiple hard-disk drives) is receiving the lion's share of disk requests, a network administrator may want to move some of the more frequently used files to another server or disk drive.

Some of the Netman statistics take advantage of the increased intelligence of the IBM Token-Ring Adapter, including displaying network topology and error counts. These statistics can be used to identify more quickly problem areas on the network discussed above.

Btos gets an upgrade

SANTA CLARA, California — Unisys has taken the wraps off Btos II, a multi-user, multitasking upgrade of its Btos operating system that supports both protected-mode and real mode operation of the 80286 and 80386 microprocessors.

Btos II is aimed at departmental or work-group computing environments and supports from two to 64 users. Unisys also unveiled communications gateways to Unisys and IBM mainframes and departmental computers and Btos Telecluster, a cluster communications system that links workstations over standard twisted-pair wires.

Any Unisys workstations running the Btos or Btos II operating system can be connected with Btos Telecluster, along with PCs using Clustershare, a recently announced software/interface card.

AI '87

AUSTRALIAN JOINT ARTIFICIAL INTELLIGENCE CONFERENCE

November 2-4 1987
Sydney Masonic Centre, Australia

KEYNOTE SPEAKERS

- * Austin Tate, director, AI Applications Institute, University of Edinburgh.
- * Tom Kehler, president, IntelliCorp.
- * Raj Reddy, president AAAI and head, Robotics Institute, Carnegie-Mellon Institute.

Forty-nine papers have so far been received for presentation at the conference, including submissions from the US, Japan and Germany. One-third relate to industry applications of AI, one-third to applied AI research, and the balance pure research. These are being evaluated by referees.

Topics short-listed include:

- * An expert system for nuclear test ban treaty verification.
- * Real time expert systems for industrial plant control.
- * Spray painting machine configuration by an expert system written in XL.
- * Database oriented expert systems.
- * The development and deployment of expert systems in the financial services industry.

Further details from:

AI'87 Secretariat, Stephen Moore, Karen Rickwood (02) 439 5133, Fax: (02) 449 5512, Telex: AA74752. Address: PO Box 929, Crows Nest, NSW 2065.

Supported by:
Australian Computer Society
Commonwealth Department of Science
NSW Department of Industrial Development and Decentralisation

In conjunction with:
Australian Knowledge Engineers Association
Australian Robot Association
Australian Speech Research Association
Commonwealth Department of Industry, Technology and Commerce
The Institution of Engineers, Australia
Victorian Department of Industry, Technology and Resources

Computerworld EXPO

OS/2 to Vax link in pipeline

By Natalie Taylor

LONDON — Olivetti is to clone IBM's Extended Edition of OS/2 — and claims it will offer a choice of PC-to-mainframe links in its communications manager so that users are not locked into IBM hardware.

"Users often have several different makes of kit," said British Olivetti Ltd marketing manager Bob Garrett. "This can prove a problem, because IBM tends to only link its machines to IBM mainframes. We will let users link their PCs to a variety of mainframes — including (Digital Equipment Corp) Vaxes."

Users are not clear what IBM's Extended Edition will offer, and may opt for compatible versions if they give better connectivity to existing equipment, industry sources said.

IBM has not set a date for the arrival of OS/2's Extended Edition, but Olivetti expects the company to ship it late next year. Garrett said Olivetti is developing its version now — on the basis of what it expects IBM to offer — and will be ready to ship a compatible system "very soon after" IBM.

"Our communications manager will tie together the SNA mainframe environment and networks with Netbios capability," Garrett said. Like IBM for OS/2, Olivetti is also readying a database manager component which will link and control PC and mainframe databases.

An Olivetti-badged standard edition of OS/2 with a compatible windowing front-end is tipped for delivery after IBM's OS/2, which is expected in the first quarter next year.

Corvus adds Netbios support

LAN maker Corvus Systems has added IBM Netbios support to its Omninet personal computer network in the first of a series of software connectivity announcements to be made over the next several months.

The Network Basic I/O System program, is loaded from the network into each networked personal computer's memory and remains available in the background while other applications are running.

It operates with either of Corvus's network operating systems: PC/Nos or Constellation.

Ethernet's on Domain

NORTH SYDNEY — Apollo Computer has opened its Domain Workstation Computing Environment to Ethernet networks, enabling its users to integrate Domain workstations more easily with other vendors' computers, such as DEC Vax minis and Unix systems when also connected to Ethernet.

A spokesman for Apollo's Australian subsidiary, Domain Computer Pty Ltd, said Apollo can offer Ethernet for users requiring standard networking, and the Apollo Token Ring for users demanding high performance communications and network expandabity.

The direct Ethernet connection has been achieved via Apollo's 802.3 Network Controller-AT, an Ethernet/IEEE 802.3 network controller board.

The spokesman said Apollo's multivendor integration and multi-networking is achieved through:

- Apollo's SR9.6 level (Unix based) operating system which provides TCP/IP communications with other Unix based systems on the same Ethernet network;
- Domain/Access software which provides Domain Workstations transparent file access to DEC Vax systems under the VMS operating system;
- The SR9.6 Network Controller-AT, which allows connection to the Ethernet backbone via the Domain 3000 workstation's IBM PC AT compatible peripherals bus.

Better control

MELBOURNE — Control Data has enhanced its CDCNet communications network to enhance file transfer capabilities between local and remote terminals in a distributed computing environment. A spokesman said that CDCNet Release 2.1 works with the company's highend computers under the Network Operating System/Virtual Environment (Nos/VE) and Networking Operating System (Nos).

Networking of Control Data and other manufacturers' host computers, workstations, disk space and printers are included in the enhancements.

The spokesman said that the enhanced network automatically transfers files between hosts, or remotely using the ISO's High Level Data Link Control (HDLC) and X.25 packet switched networks.

Asynchronous communications terminal support at 38.4K-bits/sec is supported and IBM Hasp and 3270 bisynchronous terminals are also supported.

Extra! for PS/2

SOUTH MELBOURNE — Fully optioned 3270 emulation software for the IBM PC and PS/2 range of personal computers has been produced by Attachmate and released in Australia by Distributed Data Processing Pty Ltd.

A spokesman for DDP said Extra! operates under IBM's new architecture and retains the functionality of the existing Attachmate product, including full API compatibility, PS/PC, PS/370 Import/Export support, and IBM hardware support. In addition, the support for any Lan that is compatible with Netbios can be intermixed with IBM's software on a Lan, the spokesman claimed.

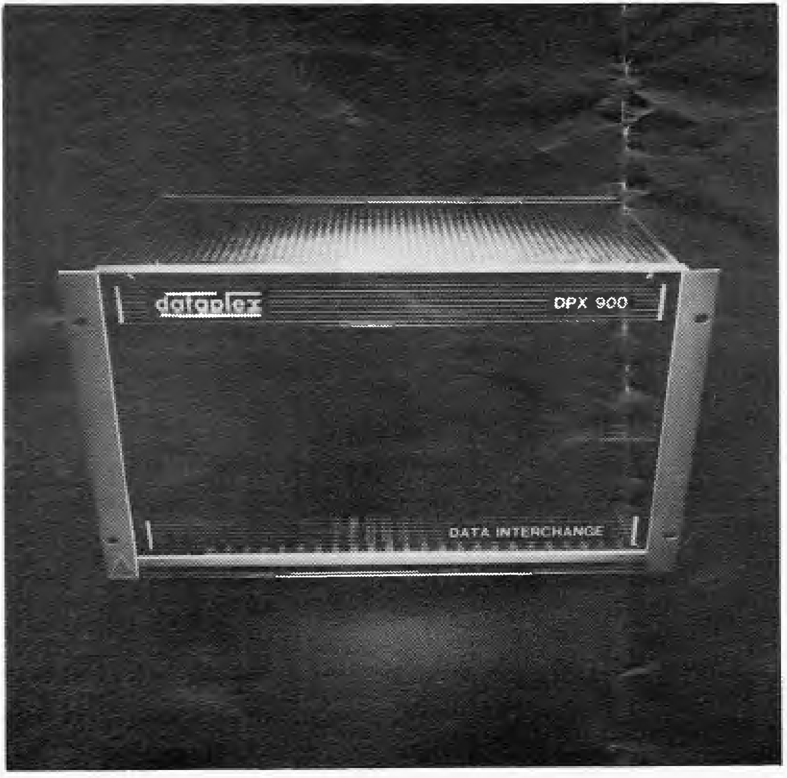
Extra! also operates on lower memory overheads, typically less than 128K-bytes for the new release, and supports coax adapters including Attachmate's 3-N-1, IBM's 3278/9 emulation adapter and 3270 Connection (PS/2), Irma (CUT mode only) and CXI PCox (in Irma mode).

YOU JUST BOUGHT YOUR LAST PORT

Adding more users doesn't mean you should add more high cost ports.

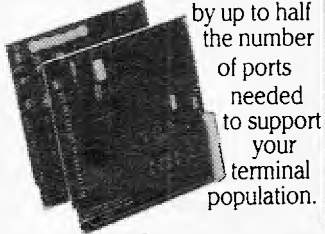
Ports are expensive - up to $1000 per port for async systems, and as terminal numbers grow, response times suffer.

For about 15% of the 'added port' cost, the DPX-900 lets you increase the user capacity of your computer without reducing performance.



Data switches provide a flexible interface between terminals, PC's, peripherals and computers. Just as your PABX manages telephone connections, allowing any extension to call another, data switches perform a similar function for data communication.

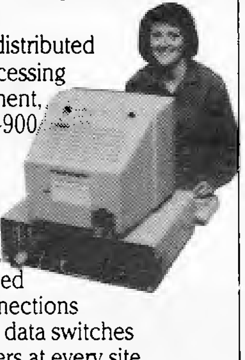
Buy fewer ports.
Instead of being hard wired to a dedicated port, terminals are connected via a data switch. Computer ports are shared between users on a needs basis, reducing by up to half the number of ports needed to support your terminal population.



Increase port productivity.
Because most terminals are really used for only a fraction of the time they are connected, expensive ports often lie idle for long periods. The DPX-900 reduces this idle time, resulting in much more efficient use of your existing ports.

Re-cabling, patching eliminated.
Where two computers are running specific applications, the DPX-900 can be used to switch terminals from one to another. With simple keyboard commands, users can move freely between computers, avoiding re-cabling or manual patch panels.

Low cost LAN. The DPX-900 operates as a star connected local area network to connect PC's, terminals and computers using low cost twisted pairs.



In a distributed data processing environment, the DPX-900 can be used to network sites together. High speed interconnections between data switches allow users at every site to share all resources on the network, irrespective of their location.

Small clusters up to 32 channels can be added to the network by using Dataplex multiplexers.

Designed in Australia and manufactured by Dataplex, the DPX-900 can be customised to meet your specific needs.

Call us today and ask about the DPX-900.
The low cost switch to efficiency.

dataplex
DATA COMMUNICATIONS
EQUIPMENT & SYSTEMS
P.O. Box 541, Lilydale, Vic. 3140.

MELBOURNE (03) 735 3333
SYDNEY (02) 550 0081
HOBART (002) 34 6613
PERTH (09) 481 4034
ADELAIDE (08) 79 9211
BRISBANE (07) 368 1641
DARWIN (089) 81 1499
CANBERRA (062) 48 5422

A LOW COST DATA SWITCH FOR SMALLER SYSTEMS

APPOINTMENTS

Analyst/Network Support Personnel

$32,858 - $34,127 per annum

This is an opportunity to participate in a nation-wide project at the leading edge of developments in distributed network technology.

Australia Post is seeking highly motivated people to form a specialist team supporting an OSI based network operating real-time and on-line electronic mail and electronic counter services to the Australian community. The Australia-wide network has a central mainframe with distributed micro-computer intelligence, acting as concentrators, supporting electronic mail applications as well as counter terminals and gateways to financial and banking principals.

You will need to have on-line/real-time data processing or data communications experience with demonstrated analytical and investigatory skills. Technical experience in any or all of the following areas is highly desirable:

- Unisys MCP Operating System (A Series)
- BTOS (or CTOS) Operating System
- Pascal
- X25
- High Level Data Link Control
- A Series Work Flow Language

We would expect you to be studying toward or have completed a Computer Science qualification or qualifications in a technically related discipline.

Australia Post offers excellent conditions of employment, including four weeks annual leave with salary bonus, long service leave and a comprehensive superannuation scheme.

For further information on the position, contact JOHN HOBBS on (03) 658 8186.

Write in confidence, quoting reference E44, E45 & E47 and the advertised position title, and including your personal, educational and employment history, by 20 August 1987, to:

The General Manager,
Personnel Department,
Australia Post,
P.O. Box 302, Carlton South, Vic. 3053.

Australia Post

AUSTRALIA POST IS AN EQUAL OPPORTUNITY EMPLOYER

20812

DATA COMMUNICATIONS

SYDNEY/MELBOURNE

Datacraft is Australia's market leader in data communications specialising in multi-user networking systems, modems, multiplexers and data concentrators.

To further strengthen our sales and support teams, the following opportunities are now available:

SALES MANAGER — SYDNEY

* A proven track record in sales/sales management.
* A background in systems sales.
* Experience in the data comms industry advantage but not necessary.
* Don't mind hard work.
* And have a salary expectation of 100K.

X.25 PRODUCT SUPPORT

* Your technical background in data comms. will include experience in X.25 and SNA. These skills and your commitment to career progression will enable you to participate in new product evaluation as well as sales support — Salary commensurate with experience.

SALESMEN/ENGINEERS

* A proven track record in sales.
* A background in System sales (X.25/mini computers or similar preferred)
* Aged between 25-40 years.
* Salary expectation of 80K plus.

Should you have experience in data communications/computer industry but do not see a position that interests you, please call anyway.

In Sydney:
Melanie O'Brien-Pounde
Tel: (02) 436 1099

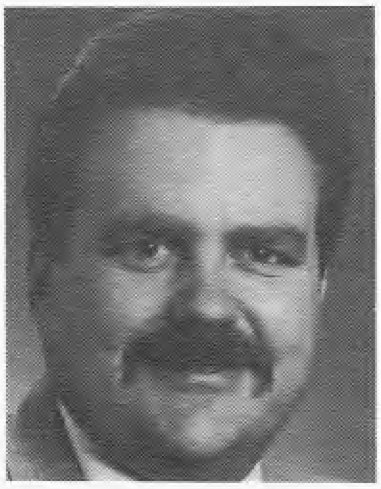
In Melbourne:
Shelley Latham
Tel: (03) 727 9111

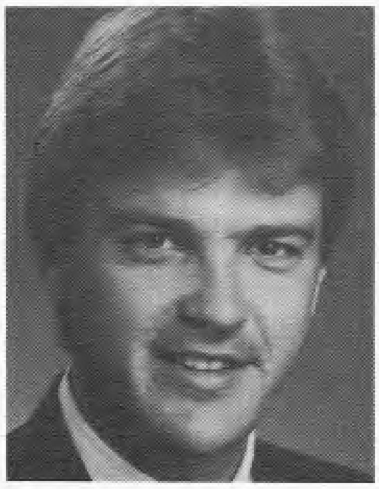
or write to: National Sales Manager, Datacraft (Aust) Pty Ltd
PO Box 353, Croydon, Vic 3136.

DATACRAFT
Data Communication

• COMMS SWITCHES •

Marilyn Ryan


Rob Slattery


David Busch

John Winters

Duncan Wyndham

AST Research Inc of California has appointed **Marilyn Ryan** sales manager for Australia and NZ. Ryan, who has just established an Australian office for AST, will report directly to Lou Meier, AST's manager of international sales. AST products are sold in Australia by Imagineering and in NZ by a sister company. Prior to joining AST Ryan was manager of the Sydney operation of Hisoft Computers Pty Ltd. AST's Australian office is at Level 21, National Mutual Centre, 44 Market St, Sydney 2000. Tel: (02) 262 2215. Fax: (02) 262 2219.

A number of appointments have been made by the Techway Group of companies in the areas of network communications and channel extension products. **Rob Slattery** has been appointed NSW sales executive for the range of network communications products distributed by Techway. **David Busch** has been appointed NSW sales manager for Techway's range of channel extension products. **Doug Thornton** has been appointed to the newly created position of account executive for channel extension products in NSW, reporting to Busch. Both have been with Techway for three years.

A joint venture between Dataplex and JN Almgren has been established in Perth under the name Netsource. The Dataplex WA team will be headed by **Pat Honeywill,** who was formerly with Datalink. He will be supported by **Tony Jamieson** and **Krystyna Tomala**. The new office is at 30 Mayfair St, West Perth 6005. Tel: (09) 481 4034.

The operator of Australia's computerised legal and business information service, Clirs Ltd, has appointed **Jon Duggan** as manager, northern region. He was formerly national sales and marketing manager at Datec.

Cashmaster Ltd, which was recently listed on the Perth Stock Exchange Second Board, has appointed **John Winters** as general manager. Winters was general manager of Attache Software from 1983 to 1985, when he was transferred to the US as national sales manager. After Attache's collapse he set up a consulting company helping Australian companies entering the US. Cashmaster has also appointed **Duncan Wyndham** as operations manager. Wyndham helped develop the Cashmaster point of sale terminal.

A number of appointments have been announced by Case Communications. Senior appointments include **Gary Hudson** as national marketing and strategic planning manager; **Hans Klerks** as northern region manager responsible for sales and service; and **Ian Martin** as Queensland manager. The company's sales force has been boosted with appointments in Sydney, Melbourne and Brisbane. In Sydney, **Keith Johnson** and **Mike Smith** have been appointed sales executives. Johnston joins the company from Data Bridge, and Smith from Racal. In Melbourne, **Ian Fewtrell** and **Vince Kerr** have been appointed sales executives. both were formerly with Racal-Milgo. **David Bird**, formerly with Philips Communications Ltd, has joined Case's Brisbane sales team.

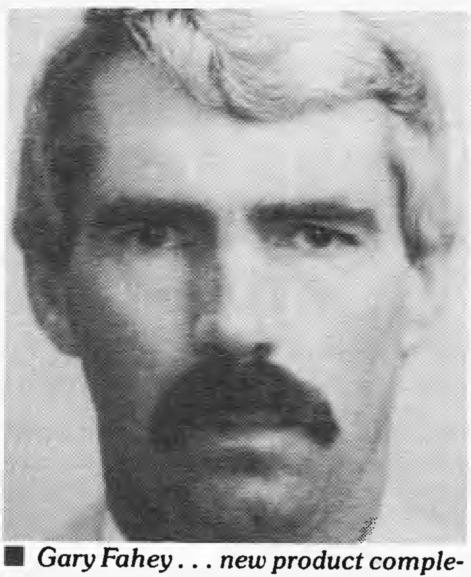
To help support its export drive, Dataplex has appointed Dacomm Electronics Services as its distributor in Singapore. The contact at Dacomm is **Ang Joo Koon**. Tel: Singapore 778 3074.

Big launch for Timeplex

SYDNEY — Timeplex will formally launch its powerful new M2 multiplexer, the 132-line Link/100, in Australia later this month or early in September, according to Gary Fahey, general manager of the company's local subsidiary.

The product, which Fahey described as complementing rather than supplanting the smaller Link/1 and Link/2 muxes, was announced in the US at the end of June, with a new network management package set to compete with IBM's Netview.

Link/100, Timeplex's most sophisticated offering for the burgeoning T1 (M2 or 2M-bit/sec in the CCITT-civilised world) market, is aimed squarely against products from leading edge suppliers such as IBM ally Network Equipment Technologies (NET) and Digital Communications Associates (DCA) — which itself started out in the US market with a pioneering Australian T1 product years ago.



■ *Gary Fahey . . . new product complements the Link/1 and Link/2 muxes.*

It will be able to support as many as 132 M2 trunk lines and around 15,000 I/O channels and is based on a new switching architecture that lets customers allocate channels dynamically, something the present Link products cannot do. Link/100 also supports a greater number of nonblocking channels and caters for both pulse-code modulation (PCM) and adaptive differential PCM.

CT offers multi-O/S server

By Sharon Fisher

SAN JOSE, California — A new offering from Convergent Technologies will allow manufacturers to produce network servers that can run Dos and Unix applications simultaneously. The 32-bit Server PC uses a 20MHz 80386 microprocessor and a 64K-bytes cache for maximum performance, Convergent said.

The AT-compatible server supports up to 64 PCs, 32 terminals, or a combination of the two. According to spokeswoman Kris Newby, the server supports Ethernet, Token-Ring, and Starlan network connections, as well as RS232C ports. Manufacturers that Newby declined to name are expected to announce products based on the Server PC within 60 to 90 days, she said.

The server runs both CTIX/386, Convergent's Unix implementation, and Dos. Networking products such as Novell's Netware, Sun's Network File System, and AT&T's Remote File Sharing will be supported. The Server PC is $US7500 for manufacturers. Intel 80387 and Weltek 1167 floating-point processors are available as options.

MODEMS

SENDATA
DATA BRIDGE
SCITEC
CEL
NetComm
CASE
dataplex

The Right Modem is easy to find — at Rosser

We stock the widest range in Australia selected from all the top manufacturers, so finding just the right model for your needs is easy. Plus we stock everything you need to get up and running straight away. Software, cables.... the lot!
We can deliver your complete modem system now so you don't have to wait weeks and weeks for supply. And as we select the best value products you will be pleasantly surprised at our competitive prices
Get your data communications on-line fast — Talk to us today.

ROSSER
COMMUNICATIONS
Suite 4, The Pymble Professional Centre,
1051-1055 Pacific Highway, Pymble, 2073
Telephone: (02) 449 8233

New Ascii terminal from Esprit

MELVILLE, New York — Esprit Systems has unveiled an Ascii terminal optimised for multi-user microcomputers running MS-Dos and Xenix

Called Opus PCT4, the $US649 terminal is said to allow users to access applications on IBM Personal Computers, PC XTs, ATs or compatibles as well as on all 80386-based micros.

In addition to MS-Dos and Xenix, the Opus PCT4 is compatible with a variety of operating systems, including Unix/Dos versions of Pick, Novell's Advanced Netware/286 and The Software Link's PCMos/386.

Like many Ascii terminals, the Opus PCT4 emulates a range of popular displays, including Wyse 50, Televideo 920/925 and DEC VT 52. In addition, the terminal's keyboard and display emulate the IBM PC user interface.

The Opus PCT4 offers dual ports, enabling concurrent connection through the same host running different sessions or separate hosts. It also enables users to hotkey between any two emulations or between PC terminal and standard Ascii display operations.

In its PC mode, the terminal is said to duplicate the complete IBM 256-character font set, keyboard layout and PC codes. It also uses the 25th line for display rather than status purposes. The terminal also features remote dialin capability via Hayes-compatible modems.

Included in the terminal's pop-up window is a utility to store and dial computer numbers using a single keystroke. Esprit said it had made the pop-up window accessories standard on its most recently released terminals.

Unisys Lan uses phone

BLUE BELL, Pennsylvania — adding another telephone twisted-pair Lan to the market, Unisys Corp has announced the Btos Telecluster, which allows PCs and Unisys workstations to communicate over the same wires that carry telephone voice traffic. Unisys said the Telecluster has a star topology, with $US375 adapters that can connect up to four daisy-chained workstations to each twisted-pair telephone line. Voice and data signals are separated by a Telecluster Hub. Unisys offers a 12-line hub for $US2150 and a 24-line hub for $US3095. Telecluster can run with any telephone system, supports distances of 400m from hub to adapter, and can run at up to 1.8M-bits/sec, Unisys said. Unisys workstations can attach directly to the network, while PCs can be connected with a previously announced $US475 interface card called Clustershare.

Lan link out

SANTA CLARA, California — Intel has unveiled PC Link2, a new version of its high-performance Ethernet Lan controller card for PCs, bundled with its INA 960 transport and network software and MS-Net.

Netbios support is planned, the company said. The product performs seven layers of the ISO model and connects two systems running under MS-Dos, Xenix, IRMX, or Vax VMS. The $US650 board comes with an 8MHz, zero-wait-state 80186 processor, an 82586 Lan controller, and 256K of Dram. It is available now.

SHOW CASE

SNAPSHOTS FROM THE EXHIBITIONS

NEW YORK — A multilingual interactive voice system and an electronic mail connection with IBM's Professional Office System (Profs) were among products introduced here at the recent combined Localnet East and Audiotex '87 conferences.

Vynet Corp, of Los Gatos, California, is marketing an interactive voice system that can speak in any language and is capable of performing voice messaging and voice response applications that require large amounts of speech and are accessible on 48 channels simultaneously, according to the company.

The company's V4000 is a PC AT-based system that costs about$US75,000 when fully configured for interactive voice applications, Vynet said.

Another product unveiled here was Profslink from PCC Systems Inc of Palo Alto, California. The product is a software feature added to the company's CC Mail, an electronic mail program for local-area networks.

Profslink is a gateway that permits users of CC Mail to exchange electronic mail messages and files with users of IBM's Profs mainframe software. Profslink, available in August, will cost $US995 per gateway.

Modem maker Hayes has unveiled a synchronous communications program that lets users communicate with an IBM system without a synchronous board. Among new products by several makers shown at the recent Information Centre Conference & Exposition in New Orleans. Hayes showed the 3270R, developed by CQ Computer Communications, which uses the Autosync feature of Hayes 2400 and V-series modems to support synchronous communications. Available now, 3270R costs beteen $US395 and $US995.

Cybertek Computer Products showed a program that offers a standard corporatewide user interface. PC Workstation Manager works as a shell between Dos and the user to simplify operations while providing custom features to speed access to applications. It offers up to 40 function keys and can be customised. The package ranges from $30 to $120 per workstation, with a minimum purchase of $3000 for 24 workstations. Purchasing PC Workstation Manager requires attendance at a three-day free training workshop at Infomart in Dallas. It requires an IBM PC, PS/2, or compatible and Dos 2.1 or later. It runs on Novell and Banyan Lans.

Forthright Systems announced that Release 2.0 of Vantagepoint would add asynchronous support to the company's data access system product. Asynchronous support allows a PC user to obtain data from a Dec Vax computer or an online service such as Dow Jones News/Retrieval. The product will continue to support IBM systems.

Communications Research Group announced a version of its PC Blast-II communications software to support The SCO Xenix Solution from The Santa Cruz Operation. The software costs $US395; existing users of Blast can upgrade to Blast-II for $US100.

SCA Products and Services released a new version of its Gateway PC product. The $350 Release 2.1 has a faster compiler and supports additional communications boards, the company said.

McGraw-Hill Information Management Co demonstrated the Executive One, a business news service that is transmitted via satellite.

DATA FILE

PRODUCT UPDATE ON MODEMS

compiled by
Gillian Sidebottom

AUSTRALIA has emerged as one of the major forces in the world market for modems. The large number of products now available and the wide range of features offered in a single package are a reflection of increasingly accessible communications and microchip technology, and the boom in personal computer workstation penetration at all levels of business.

It is evident that users in all sectors of the market are now making increasingly stringent demands on their modems in terms of speed, quality and overall performance. Recent trends indicate a swing towards faster modems (2400 bits/sec), as against the 300 bits/sec models which were predominant a few years ago.

The fourth-generation products now emerging offer much faster transmission speeds, up to 9600 bits/sec, greater flexibility, and vastly improved control over data communications transmission.

The market is split between two main segments: the hobbyist and professional users. In the recent past, growth in volumes sold has been more dramatic for the lowend consumer market, where high-quality performance, speed and associated levels of service are perceived to be relatively unimportant.

Percentage growth rates for the "professional" market, where a total solutions approach to improving and expanding corporate communications capabilities is paramount, have been less dramatic but nevertheless significant.

As the technology has become cheaper and more easily accessible, the level of user support and consultancy offered by equipment suppliers as part of a complete package is now regarded by the major vendors, and perceived by serious users, to be a dominant issue often justifying higher prices for mid/top range modems.

Although labor-intensive, fast and reliable user service is increasingly gaining recognition as one of the most important selling points, alongside Telecom approval and full compliance with CCITT vendor standards. Sophisticated users of modems, whose businesses are likely to depend to a large extent on the effectiveness of data communications links, simply cannot afford to have these links out of action for even short periods of time.

The trend towards faster and more sophisticated modems looks set to continue into the future. Such increases in transmission capabilities will pave the way for the introduction of even more advanced technology which already exists, but awaits official CCITT recognition.

Key: A-Asynchronous, S-Synchronous, HDX-Half Duplex, ADX-Adaptive Duplex, Opt-Optional, An-Analogue Loopback, D-Digital Loopback, PO A.-Price on Application, ✓-Feature available, X-Feature not available, —-Information not supplied or not applicable.

The information contained in this chart is based on information obtained from a survey of Modems Vendors/Suppliers conducted between May 18 and June 16, 1987. Details of products should be checked with the respective companies as listed.

		Transmission Compatibility				Modem Features																	
	Product Model/Manufacturer	Speed bits per second	Asynchronous/synchronous	CCITT	Bell	Full Duplex	Auto Answer	Auto disconnect	Auto Dial	Auto Ranging	Error Correction	Self-test	Remote Diagnostics	Analogue Digital Loopback	Help cues	Software included	Inbuilt memory (No. of char.)	Internal/External	Power Supply Included	Cable Included	Documentation	Warranty	Price ($A inc tax)
J N Almgren Pty Ltd — 16 Smith St, Chatswood, NSW 2067.																							**Tel: (02) 406 6177**
High-speed Dial and Leased Line Modems	Codex 2683	1200-19,200	A/S	V.24, V.28	—	HDX	—	—	—	—	✓	✓	✓	An/D	—	—	—	E/I	✓	✓	✓	90 days	P.O.A.
	Codex 2366	To 14,400	S	V.33 V.29	—	HDX	—	—	—	—	✓	✓	✓	An/D	—	—	—	E/I	—	—	—	90 days	P.O.A.
	Codex 2345	9600/7200/4800	A/S	V.29, V.27 bis	—	HDX	—	—	—	—	✓	✓	✓	An/D	—	—	—	E/I	—	—	—	90 days	P.O.A.
	Codex 2325	2400/4800	A/S	V.27 bis, V.29	—	HDX	—	—	—	—	✓	✓	✓	An/D	—	—	—	E/I	—	—	—	90 days	P.O.A.
	Codex 2265	9600-4800	A/S	V.32	—	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	—	—	E/I	—	—	—	90 days	$5050
	Codex 2255	4800	A/S	V.32	—	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	—	—	E/I	✓	✓	✓	90 days	$5187
Medium Speed Dial and Leased Line Modems	AX1400	2400/1200/1200-75, 0-300	A/S	V.22 bis, V.22, V.23, V.21	—	HDX	✓	✓	✓	✓	✓	✓	✓	An/D	—	—	—	E/I	—	—	—	—	$1300.00
	AS472A	2400/1200	A/S	V.22 bis, V.22	212	✓	✓	✓	✓	✓	—	✓	✓	An/D	—	—	—	E/I	—	—	—	90 days	$947.00
	AS472	2400/1200	A/S	V.22 bis, V.22	212	✓	✓	✓	—	✓	—	✓	✓	An/D	—	—	—	E/I	—	—	—	90 days	$886
	AS471	1200/1200, 1200-75, 300	A	V.23, V.21	—	HDX	✓	✓	—	—	—	✓	—	An/D	—	—	—	E/I	—	—	—	90 days	$440.00
	AS470	1200/75, 300	A	V.22, V.21	—	HDX	✓	✓	✓	—	—	✓	—	An/D	—	—	—	E/I	—	—	—	90 days	$610.00
Short distance Modems and Multiplexers	AX440	50-19,200	A/S	V.24, V.28	—	—	—	—	—	—	—	✓	✓	An/D	—	—	—	E/I	—	—	—	—	$584.00
	AX442	48,000-72,000	A/S	V.35	—	—	—	—	—	—	—	✓	✓	An/D	—	—	—	E/I	—	—	—	—	$1041.96
	AX450	1200-19,200	A/S	V.24, V.28	—	—	—	—	—	—	—	✓	✓	An/D	—	—	—	E/I	—	—	—	—	$1607.40
	AX445	1200-19,200	A/S	V.24, V.28	—	—	—	—	—	—	—	✓	✓	An/D	—	—	—	E/I	—	—	—	—	$1926.60
	AX460	1200-19,200	A/S	V.24, V.28	—	—	—	—	—	—	—	✓	✓	An/D	—	—	—	E/I	—	—	—	—	$2188.80
Case Communication Systems Ltd — 10-12 Rodborough Rd, Frenchs Forest, NSW 2086.																							**Tel: (02) 451 6655**
	Case Quattro	300-2400	A/S	V.21, V.23, V.22, V.22 bis	103/212A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2K	E/I	✓	Opt	✓	90 days	$1495.00
	RV22B	1200/2400	A/S	V.22, V.22 bis	202/212A	✓	✓	✓	x	x	x	✓	✓	✓	x	x	—	E/I	✓	Opt	✓	90 days	$684.00
	SD1222	1200	A/S	V.22	—	✓	✓	✓	x	x	x	x	x	x	x	x	—	E/I	✓	Opt	✓	90 days	$517.00
	SB2426	2400	S	V.26	—	HDX	Opt	✓	Opt	x	x	x	x	x	x	x	—	E/I	✓	Opt	✓	90 days	$1219.00
Data Bridge Electronic Communication Pty Ltd — Suite 408, Henry Lawson Business Centre, Cary St, Drummoyne, NSW 2047.																							**Tel: (02) 819 6474**
	DSP-1200	1200	A/S	V.22	212A	✓	✓	✓	✓	—	Opt	✓	CCITT V/54	CCITT V/54	✓	✓	—	E	✓	✓	✓	1 yr	$840.00
	DSP-2400	1200/2400	A/S	V.22 bis, V.22	212A	✓	✓	✓	✓	✓	Opt	✓	✓	✓	✓	✓	—	E	✓	✓	✓	1 yr	$989.00
	DSP-1230	300/1200/75	A/S	V.22, V.23, V.21	212A	✓	✓	✓	✓	✓	Opt	✓	✓	✓	✓	✓	—	E	✓	✓	✓	1 yr	$899.00
	DSP-1234	300/1200-75/1200, 2400	A/S	V.21, V.22, V.23, V.22 bis	212A	✓	✓	✓	✓	✓	Opt	✓	✓	✓	✓	✓	—	E	✓	✓	✓	1 yr	$1199.00
Datacraft (Australia) Pty Ltd — Maroondah Hwy, Croydon, Vic 3136.																							**Tel: (03) 727 9111**
	550	1200, 2400, 4800, 9600, 19200	A/S	—	—	✓	—	—	—	—	x	✓	✓	An/D	—	x	—	E	✓	✓	✓	12m	$998.00
	530 Baseband Modem	0-1200, 2400, 4800, 9600, 19200	A/S	—	—	✓	—	—	—	—	—	✓	✓	An/D	—	—	—	E	✓	✓	✓	12m	$556.00
	510 Line Driver	300, 600, 1200, 2400, 4800, 9600	A	—	—	✓	—	—	—	—	x	x	x	x	—	—	—	E	✓	—	✓	12m	$249.00
	571 Packet Link	1200, 2400	S	X25, X32, V22 bis	—	✓	✓	✓	✓	—	✓	✓	✓	An/D	X25	—	✓	E	✓	✓	✓	12m	$2114.00
	5096	9600, 4800, 2400	S	V.29, V.27	—	✓	—	—	—	—	x	✓	✓	An/D	x	x	—	E	✓	✓	✓	12m	$2250.00
	5096 mux (4 channel mux included)	9600, 4800, 2400	S	V.29m V.27	—	✓	—	—	—	—	x	✓	✓	An/D	x	x	—	E	✓	✓	✓	12m	$3250.00

PRODUCT UPDATE: MODEMS

	Transmission Compatibility				Modem Features																	
Product Model/Manufacturer	Speed bits per second	Asynchronous/synchronous	CCITT	Bell	Full Duplex	Auto Answer	Auto disconnect	Auto Dial	Auto Ranging	Error Correction	Self-test	Remote Diagnostics	Analogue Digital Loopback	Help cues	Software Included	Inbuilt memory (No. of char.)	Internal/External	Power Supply Included	Cable Included	Documentation	Warranty	Price ($A inc tax)
Datacraft (Australia) Pty Ltd — Maroondah Hwy, Croydon, Vic 3136.																						**Tel: (03) 727 9111**
5312AA	300, 75/1200, 1200/1200, 1200/75	A	V.21, V.23	103/202	✓	✓	✓	x	✓	x	✓	✓	D	x	x	—	E	✓	✓	✓	90 days	$501.00
5123 Trimodem	300, 75/1200, 1200, 600	A	V.21, V.22, V.23	103/212	✓	✓	✓	✓	✓	x	✓	✓	An/D	✓	✓	✓	E	✓	✓	✓	90 days	$975.00
5234 Quad Modem	300, 75/1200, 1200, 2400	A	V.21, V.22, V.23, V.22 bis	103/212	✓	✓	✓	✓	✓	x	✓	✓	An/D	✓	✓	✓	E	✓	✓	✓	90 days	$1102.00
5234S Quad Modem	300, 75/1200, 1200, 2400	A/S	V.21, V.22	103/212	✓	✓	✓	✓	✓	x	✓	✓	An/D	✓	✓	✓	E	✓	✓	✓	90 days	$1245.00
Concord V22 Data Modem	1200, 600, 300	A/S	V.22	✓	✓	✓	✓	x	✓	x	✓	✓	An/D	✓	x	x	E	✓	✓	✓	90 days	$715.00
Concord V22 bis Data Modem	2400, 1200	A/S	V.22 bis	✓	✓	✓	✓	x	✓	x	✓	✓	An/D	✓	x	x	E	✓	✓	✓	90 days	$1034.00
Concord V22 bis ARQ Modem	2400, 1200	A/S	V.22 bis	✓	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	x	✓	E	✓	✓	✓	90 days	$1515.00
Concord V22 bis Autodial Modem	2400, 1200	A/S	V.22 bis	✓	✓	✓	✓	✓	✓	x	✓	✓	An/D	✓	x	—	E	✓	✓	✓	90 days	$1138
Concord V22 bis Superduplex Modem	2400, 1200	A/S	V.22 bis	Same features as above plus multiplexer																		$2299.00
Concord V32 Trellis Modem (a)	9600, 4800	S	V.32	✓	✓	✓	✓	x	✓	✓	✓	✓	An/D	✓	x	✓	E	✓	✓	✓	90 days	$5309.00
Concord V32 Trellis Modem (b)	9600, 4800 plus extra features	S	V.32	✓	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	x	✓	E	✓	✓	✓	90 days	$5928.00
24I	2400, 1200m 110/300	A	V.22 bis	103/212A	✓	✓	✓	✓	✓	x	✓	✓	An/D	✓	✓	✓	I	—	—	✓	90 days	$923.00
12I	110/300, 1200	A	V.22	103/212A	HDX	✓	✓	✓	✓	x	✓	✓	An/D	✓	✓	✓	I	—	—	✓	90 days	$615.00
Dataplex Pty Ltd — 28 John Street, Lilydale, Vic 3140.																						**Tel: (03) 735 3333**
Dataplex 224.01	75/300/1200/2400	A/S	V.21, V.23, V.22, V.22 bis	103, 202, 212A	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	Opt	2K	E	✓	✓	✓	12m	$1288.00
Dataplex 224 PC	75/300/1200/2400	A/S	V.21, V.23, V.22, V.22 bis	103, 202, 212A	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	Opt	2K	I	x	✓	✓	12m	$1180.00
Datasat, 8 Lachlan St, Liverpool, NSW 2170.																						**Tel: (02) 821 1622**
Datasat V1275	300, 1200/75	A	V.21, V.23	—	✓	x	x	x	x	x	x	x	x	x	Opt	x	E	✓	✓	✓	12m	$295.00
Vtex Desk Modem	300/1200	A	V.21, V.23	—	✓	✓	✓	✓	✓	x	x	x	x	✓	Opt	—	E	✓	✓	✓	12m	$450.00
Vtex Card Modem	300, 1200	A	V.21, V.23	—	✓	—	—	—	—	—	—	—	—	—	Opt	—	I	✓	✓	✓	12m	$450.00
Vtex Card Kit	300, 1200	A	V.21, V.23	—	✓	—	—	—	—	—	—	—	—	—	✓	—	I	✓	✓	✓	12m	$555.00
Netcomm (Australia) Pty Ltd — Unit B, 25 Paul St, North, North Ryde, NSW 2113.																						**Tel: (02) 888 5533**
Modem 64/128	300/300, 1200/75	A	V.21, V.23	—	✓	✓	✓	✓	✓	x	x	x	x	✓	✓	—	E	✓	✓	✓	2yrs	$341.00
Modem 3+12A	300/300, 1200/75	A	V.21, V.23	103	✓	—	—	—	—	—	✓	—	An	✓	✓	—	E	✓	✓	✓	2yrs	$341.00
Modem 3+12NCP	300/300, 1200/75	A	V.21, V.23	103	✓	—	—	—	—	—	✓	—	An	✓	✓	—	E	✓	✓	✓	2yrs	$341.00
Automodem 21/23	300/300, 1200/75, 75/1200	A	V.21, V.23	103	✓	✓	✓	✓	—	—	✓	✓	An/D	✓	Opt	8.3K	E	✓	✓	✓	2yrs	$549.00
Automodem 12/12	300/300 (Bell only), 1200/75	A	V.22	103/212A	✓	✓	✓	✓	—	—	✓	✓	An/D	✓	Opt	8.3K	E	✓	✓	✓	2yrs	$699.00
Automodem 24/24	300/300, (Bell only), 1200/1200, 2400/2400	A	V.22, V.22 bis	103/212A	✓	✓	✓	✓	—	—	✓	✓	An/D	✓	Opt	8.3K	E	✓	✓	✓	2yrs	$999.00
Automodem 123	300/300, 1200/75, 75/1200, 1200/1200	A	V.21, V.23, V.22	103/212A	✓	✓	✓	✓	—	—	✓	✓	An/D	✓	Opt	8.3K	E	✓	✓	✓	2yrs	$925.00
Automodem 1234	300/300, 1200/75, 75/1200, 1200/1200, 2400/2400	A	V.21, V.23, V.22, V.22 bis	103/212A	✓	✓	✓	✓	—	—	✓	✓	An/D	✓	Opt	8.3K	E	✓	✓	✓	2yrs	$1125.00
Smartmodem 21/23SA	300/300, 1200/75, 75/1200, 1200 HDX	A/S	V.21, V.23	103	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	E	✓	✓	✓	2yrs	$675.00
Smartmodem 1200SA	300/300, (Bell only), 1200/1200 (2400 upgrade)	A/S	V.22 (Upgrade to V.22 bis)	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	E	✓	✓	✓	2yrs	$895.00
Smartmodem 2400SA	300/300 (Bell only) 1200/1200, 2400/2400	A/S	V.22, V22 bis	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	E	✓	✓	✓	2yrs	$1195.00
Smartmodem 123SA	300/300, 1200/75, 75/1200, 1200 HDX, 1200/1200 (2400 upgrade)	A/S	V.21, V.22, V.23 (Upgrade to 22 bis)	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	E	✓	✓	✓	2yrs	$1199.00
Smartmodem 1234SA	300/300, 1200/75, 75/1200, 1200 HDX, 1200/1200, 2400/2400	A/S	V.21, V.23, V.22, V.22 bis	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	E	✓	✓	✓	2yrs	$1499.00
Datalock 123SA	300/300, 1200/75, 75/1200, 1200 HDX, 1200/1200 (2400 upgrade)	A/S	V.21, V.23, V.22 (Upgrade to V.22 bis)	103/212A	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	✓	42K	E	✓	✓	✓	2yrs	$1499.00
Datalock 1234SA	300/300, 1200/75, 75/1200, 1200 HDX, 1200/1200, 2400/2400	A/S	V.21, V.23, V.22 V.22 bis)	103/212A	✓	✓	✓	✓	✓	✓	✓	✓	An/D	✓	✓	42K	E	✓	✓	✓	2yrs	$1799.00
PC In/Modem	300/300, 1200/75, 75/1200,	A	V.21, V.23	103	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	1.9K	I	✓	✓	✓	2yrs	$569.00
In/Modem 1200	300/300 (Bell only), 1200/1200 (2400)	A	V.22, Upgrade to V.22 bis	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	I	✓	✓	✓	2yrs	$699.00
In/Modem 2400	300/300 (Bell only), 1200/1200, 2400/2400	A	V.22, V.22 bis	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	I	✓	✓	✓	2yrs	$999.00
In/Modem 123	300/300, 1200/75, 75/1200, 1200/1200 (2400)	A	V.21, V.23, V.22 (Upgrade to V.22 bis)	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	I	✓	✓	✓	2yrs	$925.00
In/Modem 1234	300/300, 1200/75, 75/1200, 1200/1200 2400/2400	A	V.21, V.23, V.22, V.22 bis	103/212A	✓	✓	✓	✓	✓	—	✓	✓	An/D	✓	✓	3.8K	I	✓	✓	✓	2yrs	$1225.00
Smartmodem 9648FT	2400, 4800, 7200, 9600	S	V.27, V.29	—	HDX	✓	✓	✓	—	—	✓	✓	An/D	✓	✓	34K	E	✓	✓	✓	2yrs	$3300.00
Smartmodem 9648DP	2400, 4800, 7200, 9600	S	V.27, V.29	—	HDX	✓	✓	✓	—	—	✓	✓	An/D	✓	✓	34K	E	✓	✓	✓	2yrs	$2252.00
Smartmodem 9648HD	2400, 4800, 7200, 9600	S	V.27, V.29	—	HDX	✓	✓	✓	—	—	✓	—	An	✓	✓	34K	E	✓	✓	✓	2yrs	$1933.00
Trailblazer	1200/1200, 2400/2400, 18,000 ADX	A	V.22, V.22 bis	212A	ADX	✓	✓	✓	✓	✓	✓	✓	—	✓	Opt	132K	E	✓	✓	✓	1yr	$3468.00
Trailblazer PC	1200/1200, 2400/2400, 18,000 ADX	A	V.22, V.22 bis	212A	ADX	✓	✓	✓	✓	✓	✓	✓	—	✓	✓	132K	I	✓	✓	✓	1yr	$3242.00

PRODUCT UPDATE: MODEMS

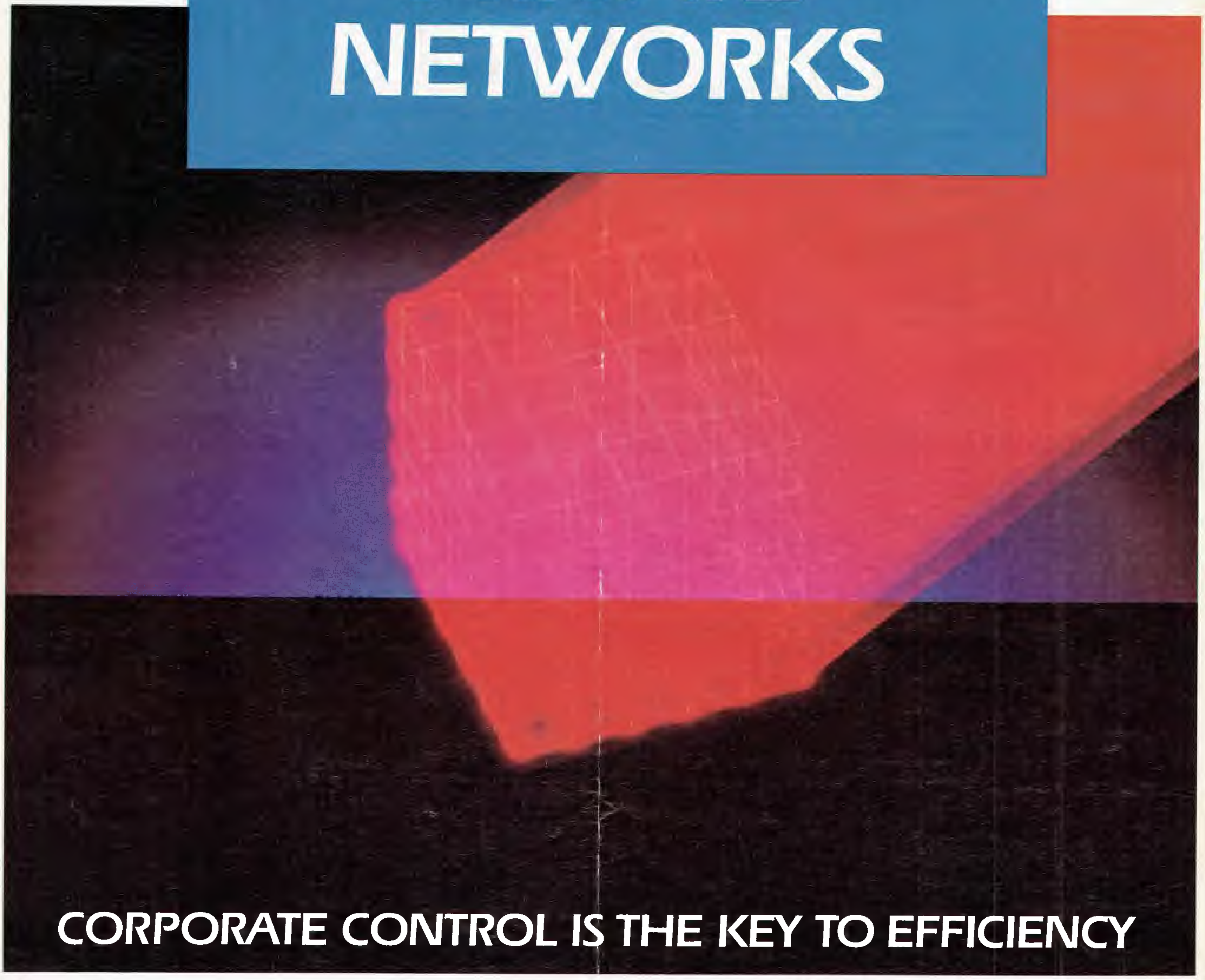
DATA FILE

Product Model/Manufacturer	Speed bits per second	Asynchronous/synchronous	CCITT	Bell	Full Duplex	Auto Answer	Auto disconnect	Auto Dial	Auto Ranging	Error Correction	Self-test	Remote Diagnostics	Analogue Digital Loopback	Help cues	Software Included	Inbuilt memory (No. of char.)	Internal/External	Power Supply Included	Cable Included	Documentation	Warranty	Price ($A inc tax)
	Transmission Compatibility				Modem Features																	
The Nice Computer Company of Australia Pty Ltd — Suite 3, 41 Rawson St, Epping, NSW 2121.																						**Tel: (02) 869 8777**
Nice Modem 2	300FDX, 1200/75, 75/1200, 1200FDX	A	V.21, V.22, V.23	103/212	✓	✓	✓	✓	✓	x	✓	x	D	✓	x	2K	E	✓	✓	✓	12m	$749.00
Modem 3	300, 1200/75, 75/1200	A	V.21, V.23	103	✓	✓	✓	✓	✓	x	✓	x	D	✓	x	2K	E	✓	✓	✓	12m	$549.00
Inside 1	300, 1200/75, 75/1200	A	V.21, V.23	103	✓	✓	✓	✓	✓	x	✓	✓	An/D	x	✓	40K	I	x	✓	✓	12m	$599.00
Inside 2	300FDX, 1200/75, 75/1200, 1200FDX	A	V.21, V.22, V.23	103/212	✓	✓	✓	✓	✓	x	✓	✓	An/D	x	✓	40K	I	x	✓	✓	12m	$849.00
Pulsar Electronics, Catalina Drive, Tullamarine, Vic 3043.																						**Tel: (03) 330 2555**
Sam Modem	300/300, 1200/1200, 1200/75	A	V.21. V.22, V.23	—	✓	✓	✓	✓	✓	x	✓	✓	An/D	✓	✓	32K	E	✓	✓	✓	12m	$862.00
Rosser Communications — Suite 4, 1051 Pacific Hwy, Pymble, NSW 2073.																						**Tel: (02) 449 8233**
Cunninghams CE DATA 2301	300/1275	A	V.21, V.23	—	✓	x	—	x	x	x	x	x	x	x	Opt	x	E	✓	Opt	✓	12m	$280.00
CE DATA 2123	300/1275	A (S opt)	V.21, V.23	103/202	✓	✓	✓	Opt	x	x	x	x	A	x	Opt	64	E	✓	Opt	✓	12m	$440.00
CE DATA 123AD	300/1275/1200	A/S	V.21, V.23, V.22	103/202/212A	✓	✓	✓	✓	✓	x	x	x	A	x	Opt	64	E	✓	Opt	✓	12m	$989.00
Scitec Communication Systems Ltd — 3 Apollo Place, Lane Cove, NSW 2066.																						**Tel: (02) 428 9555**
Business 2200	1200	A/S	V.22, V.25 bis	103	✓	✓	✓	✓	x	x	✓	✓	An/D	✓ V.25 bis		50 x 17 V.25 bis	E	✓	x	✓	3m	$874.00
Business 2400	1200/2400	A/S	V.22, V.22 bis, V.25, V.25 bis	212A	✓	✓	✓	✓	✓	x	✓	✓	An/D	✓ V.25 bis		50 x 17 V.25 bis	E	✓	x	✓	3m	$1472.00
Business 2123	300 75/1200, 1200HD	A	V.21, V.23, V.22HD	103	✓	✓	✓	✓	✓	x	✓	x	An	✓ V.25 bis		last no. redial	E	✓	x	✓	3m	$633.00
Business Tristar	300, 75/1200, 1200	A/S	V.21, V.23, V.22	103/212A	✓	✓	✓	✓	✓	x	✓	✓	An/D	x		x	E	✓	x	✓	3m	$1472.00
Business Olympic	300, 75/1200, 2400	A/S	V.21, V.22, V.23 V.22 bis	103/212A	✓	✓	✓	✓	✓	x	✓	✓	An/D	x		last no. redial	E	✓	x	✓	3m	$1725.00
Sendata Communications Pty Ltd — 67 Nicholson St, St Leonards, NSW 2065.																						**Tel: (02) 438 4255**
4321AD	300, 1200, 2400, 75/1200, 1200/75	A/S	V.21, V.23, V.22, V.22 bis	103/202	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8K	E	✓	✓	✓	2 yrs	$1740.00
4321INT	300, 1200, 2400, 75/1200, 1200/75	A/S	V.21, V.23, V.22, V.22 bis	103/202	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2K	I	x	✓	✓	2 yrs	$1656.00
321AD	300, 1200, 75/1200	A/S	V.21, V.23, V.22	103/202	✓	✓	✓	✓	✓	✓	x	x	x	x	✓	x	E I (Opt)	✓	✓	✓	2 yrs	$1296.00
V22AD	1200	A/S	V.22	202	✓	✓	✓	✓	x	✓	x	x	x	x	✓	x	E	✓	✓	✓	2 yrs	$1056.00
321AA	1200, 300, 75-1200	A/S	V.21, V.22, V.23	—	✓	✓	✓	x	✓	x	x	x	x	x	x	x	E	✓	✓	✓	2 yrs	$1104.00
V22 bis AD	2400, 1200	A/S	V.22, V.22 bis	—	✓	✓	✓	✓	✓	✓	x	x	✓	x	✓	x	E	✓	✓	✓	2 yrs	$1488.00
V22	1200	A/S	V.22	—	✓	✓	✓	x	x	x	x	x	x	x	x	x	E	✓	✓	✓	2 yrs	$792.00
1275INT	300, 1200/75	A	V.21, V.23	—	✓	✓	✓	✓	✓	✓	x	x	x	x	✓	x	I	x	✓	✓	2 yrs	$660.00
2000	300, 1200HD, 75/1200, 1200/75	A/S	V.21, V.23	103/202	✓	✓	✓	x	x	x	x	x	x	x	x	Opt	E	✓	✓	✓	2 yrs	$660.00
1275	300, 1200/75	A	V.21, V.23	103/202	✓	x	x	x	x	x	x	x	x	x	x	Opt	E	✓	✓	✓	2 yrs	$312.00
300M	300	A	V.21	103	✓	Opt	—	—	—	—	—	—	—	—	—	—	E	✓	x	✓	2 yrs	$240.00
700M	300, 1275, 75/1200, 1200HD	A/S	V.21, V.23	103/202	✓	—	—	—	—	—	—	—	—	—	—	—	E	—	—	✓	2 yrs	$354.00
2927	9600, 4800	S	V.29, V.27	—	✓	x	x	x	x	x	✓	x	✓	✓	x	32K	E	✓	✓	✓	2 yrs	$1800.00
Security Adapter	300-19.2K	A/S	V.21, V.23, V.22, V.22 bis	103/202	✓	x	x	✓	x	✓	x	x	x	x	x	32K	E	✓	✓	✓	2 yrs	$696.00
Sendata Guard	1200, 2400	—	V.22, V.22 bis	—	✓	x	x	✓	x	x	x	x	x	x	x	8K	E	✓	—	✓	2 yrs	$540.00
Shuttle Datacomm — 30/456 St Kilda Rd, Melbourne 3000																						**Tel: (03) 267 1011**
Cicada 312	300, 1200/75	A	V.21, V.23	—	✓	—	—	—	—	—	—	—	—	—	x	x	E	✓	x	✓	12m	$245.00
Shuttle 312AD	300, 1200/75	A	V.21, V.23	✓	✓	✓	✓	✓	—	—	—	—	—	—	x	x	E	✓	x	✓	12m	$594.00
Shuttle Volksmodem VM12	1200/1200	A	V.22	212A	✓	✓	✓	✓	—	—	—	—	—	—	x	x	E	✓	x	✓	12m	$595.00
Shuttle Express	1200/1200	A	V.22	212A	✓	✓	✓	✓	—	—	✓	—	A	—	x	480	E	✓	x	✓	12m	$890.00
Shuttle Secure 12	1200/1200	A	V.22	212A	✓	✓	✓	✓	—	—	✓	—	A	—	x	480	E	✓	x	✓	12m	$990.00
Shuttle 123	300/1200/75/1200	A	V.21, V.22, V.23	212	✓	✓	✓	✓	✓	—	✓	—	—	—	x	—	E	✓	x	✓	12m	$998.00
Shuttle Lightning 24	300/1200/2400	A	V.22 bis, V.22	212A/103/113	✓	✓	✓	✓	✓	—	—	—	—	—	x	48	E	✓	x	✓	12m	$895.00
Race I	1200/2400/4800/7200/9600	A	V.22, V.22 bis, V.27, V.29	212A/103/113	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	310	E	✓	x	✓	12m	$3250.00
Race II	1200/2400/4800/7200/9600	A	V.22, V.22 bis, V.27, V.29	212A/103/113	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	E	✓	x	✓	12m	$3700.00
Race BMX Block Mode Xcelerator	1200/2400/4800/7200/9600	A	V.22, V.22 bis, V.27, V.29	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	310	E	✓	x	✓	12m	$2750.00
Rally 9600 Leased Line Modem	2400/4800, 4800/9600	S	V.27, V.29	—	✓	—	—	—	—	✓	✓	✓	A	✓	x	✓	E	✓	x	✓	12m	$2500.00
Race I VM24	2400/4800, 4800/9600	A	V.22 bis, V.27, V.29	212A/103/113	✓	✓	✓	✓	✓	—	✓	✓	✓	✓	x	✓	E	✓	x	✓	12m	$3800.00
Telecorp Pty Ltd — 21 Tepok Rd, Terrey Hills, NSW 2084.																						**Tel: (02) 450 2522**
Fastcomm 96	9600	A	V.29	—	ADX	✓	—	✓	✓	✓	✓	✓	A	✓	✓	—	E/I	—	—	✓	—	$3460.00
Fastcomm Plus 2496	9600/2400/1200/300	A	V.29, V.22 bis, V.22, V.21	212A/103	ADX ✓	✓	—	✓	✓	✓	✓	✓	A/D	—	✓	—	E/I	—	—	✓	—	$4400.00

Key: A-Asynchronous. S-Synchronous. HDX-Half Duplex. ADX-Adaptive Duplex. Opt-Optional. An-Analogue Loopback. D-Digital Loopback. P.O.A.-Price on Application. ✓-Feature available. X-Feature not available. —Information not supplied or not applicable.

The information contained in this chart is based on information obtained from a survey of Modems Vendors/Suppliers conducted between May 18 and June 16, 1987. Details of products should be checked with the respective companies as listed.

PRIVATE NETWORKS



CORPORATE CONTROL IS THE KEY TO EFFICIENCY

Modern organisations are increasingly dependent on their communications strategies to maintain their competitive position. The ability to design and manage an efficient communications network is central to your ability to control your corporate destiny.

Control and Flexibility

Control of your organisation's communications system and flexibility are key benefits of a private network. You can reconfigure your network as your organisation changes. As needs change within your organisation, a private network can be adapted much more quickly to address these needs.

Integration and Reliability

With the Scitec MAXIMA communications resources manager, you have the essential tool for building an intelligent, private communications network. Such a network can save enormous costs through the integration of disparate data and voice transmissions. But this is only half the equation.

Reliability – the resilience to network failures is the other half. A communications network that is not working can be very expensive in terms of lost productivity and lost business opportunities. MAXIMA has been designed to incorporate high levels of functional redundancy and automatic trunk re-routing features to ensure maximum network up-time.

Support and Service

Technical assistance with network design and planning are all part of Scitec's comprehensive support for your private network. Scitec is the only specialist communications company with offices in all mainland capital cities, and these offices are staffed with qualified engineers who can maintain your network in all conditions. Additional support is now available from our National Operations Centre (NOC) in Sydney. The NOC provides dial up fault analysis and performance evaluation on line to your network.

If you require further assistance in the planning of your private communications network, contact your local Scitec office.

SCITEC

Communication Systems

SYDNEY (02) 428 9555 **MELBOURNE** (03) 690 8622 **CANBERRA** (062) 85 1844 **BRISBANE** (07) 371 9122 **ADELAIDE** (08) 364 0233 **PERTH** (09) 324 1599